



SATURDAY, OCTOBER 24, 1874.

Improved Radial Drilling Machine.

The engraving on this page represents an improved radial drilling machine manufactured by Messrs. Wm. B. Bement & Son, of Philadelphia, which forms part of the display of tools by that firm at the exhibition at the Franklin Institute in Philadelphia. The following description we copy from a contemporary:

Power is received by a cone of four changes, back-gearing, giving eight motions to the spindle. The connection between the cone and spindle is through suitable shafts and bevel gears, the arrangement of which will be readily understood from the engraving. A knob projecting from the rear end of the cone-shaft operates a sliding clutch, locking the cone to the shaft when the back gearing is not used.

The arm, upon which the spindle-bearing has its radial adjustment, has cast upon its inner end a large and substantial hollow sleeve, carefully fitted upon the upper part of the main column, on which it revolves when required, or can be made fast in any position by a single clamping screw.

The vertical feed movement of the spindle has three changes, and is exceedingly simple and efficient. It may be instantly disconnected from the spindle, which can then be easily and rapidly moved through its whole vertical traverse by a hand level conveniently placed for the purpose, being retained in any position by its counterbalance. This serves the further important purpose of steadying the downward motion of the drill, when the material is unsound, or after its point has penetrated the lower surface of the work.

The large and strong base-plate, planed and slotted, affords a true and convenient surface upon which to place work of the larger class. Large and irregular castings may be leveled and secured by blocking and bolting and the drill-spindle adjusted to operate upon any part of their surface.

The lower part of the column, on the side opposite the driving cone, is formed into a hollow bracket carrying at its outer end a table for lighter work. Its adjustments are practically universal; since it can be raised and lowered through a considerable range, rotated on its vertical axis, its upper surface inclined at any angle from horizontal to perpendicular, and it can be rigidly secured in any of its various positions.

The machine as a whole is calculated for doing a great variety of work with accuracy, convenience, and rapidity, and is worthy of the reputation of its builders, Messrs. Wm. B. Bement & Son, of the Industrial Works, in Philadelphia.

The Chicago Railroad Meeting.

The meetings of railroad managers, general freight agents and general ticket agents held in Chicago last week (on the 14th and 15th) were called by the following circular from the Western Railroad Bureau:

COLUMBUS, Ohio, Oct. 5.

DEAR SIR: For the information and benefit of the Board of Commissioners of Western Railroads, you are requested to instruct your General Freight Agent to furnish the Commission as soon as the 10th inst. a full list of the competing points which are reached by your road. Also, state what points they can suppress as competing points by agreement. And also if the rates to any of the points retained as competing can be raised above the scale of Graham's rates (Chicago basis) by agreement with other roads interested. Also send copies of your classifications for each of the six commissioners. We also request that you instruct your General Freight Agent to meet us at the Grand Pacific Hotel, Chicago, on the 14th inst.; and your General Ticket Agent on the 15th inst. And we earnestly request the presence of yourself at these meetings as subjects of great importance, relating to both branches of traffic will be submitted for consideration.

GEORGE B. WRIGHT.

Chairman Western Railroad Commissioners.

The following circular also was issued by a committee of general passenger agents:

ST. LOUIS, Oct. 7.

DEAR SIR: At a meeting of general superintendents of Western lines, of which Robert Harris, General Superintendent of the Chicago, Burlington and Quincy Railroad, was Chairman, held at the Southern Hotel to-day, the following resolution was adopted.

Resolved, That the Chairman appoint a committee of five general passenger and ticket agents, who are hereby authorized to call a meeting of the general passenger and ticket agents of the various competing lines in the West at the Grand Pacific Hotel, Chicago, Wednesday, Oct. 14, at 10 o'clock a. m., to consult with each other, and, if possible, submit a plan for the abolishment of excursion rates, the reduction of passenger expenses, etc.

Under the resolution the Chairman appointed the undersigned as a committee, and we have therefore to respectfully request your attendance at the meeting designated above.

Respectfully yours,

E. A. FORD,
J. CHARLTON,
C. K. LOMB,
T. PENFIELD,
A. C. DAWES,
Committee.

The different bodies met separately, and all conferred with the Commissioners, the whole Western Bureau (Messrs. Geo. B. Wright, Columbus; L. N. Andrews, Indianapolis; E. R. Wadsworth, Chicago; Warren Colburn, Cleveland; Isaac H. Sturgeon, St. Louis; J. S. Newberry, Detroit); being present, and Messrs. B. W. Blanchard, and William Denison of the Eastern Bureau; Mr. Thomas L. Jewett of that Bureau being absent on account of sickness.

The following freight men were present: Wm. Stewart, General Freight Agent Pennsylvania; F. H. Kingsbury, Assistant General Freight Agent Pittsburgh, Cincinnati & St. Louis; H. W. Hibbard, General Freight Agent Vandalia Line and Paris & Decatur; H. C. Diehl, General Freight Agent Indianapolis, Bloomington & Western; J. S. Campbell, General Freight Agent Chicago, Danville & Vincennes; A. B. Leet, General Freight Agent Grand Rapids & Indianapolis; C. H. Crosby, General Freight Agent St. Louis & Southeastern; H. C. Hinman, General Freight Agent Jeffersonville, Madison & Indianapolis; L. Hills, Cleveland, Columbus, Cincinnati & Indianapolis; J. B. Reed, Cincinnati, Hamilton & Dayton; Jas. Smith, Chicago & Alton; Thomas Hoops, Michigan Central; E. S. Waldron, Cincinnati, Lafayette & Chicago; S. Howell, Detroit, Eel River & Illinois; C. B. Lockwood, Cincinnati, San-

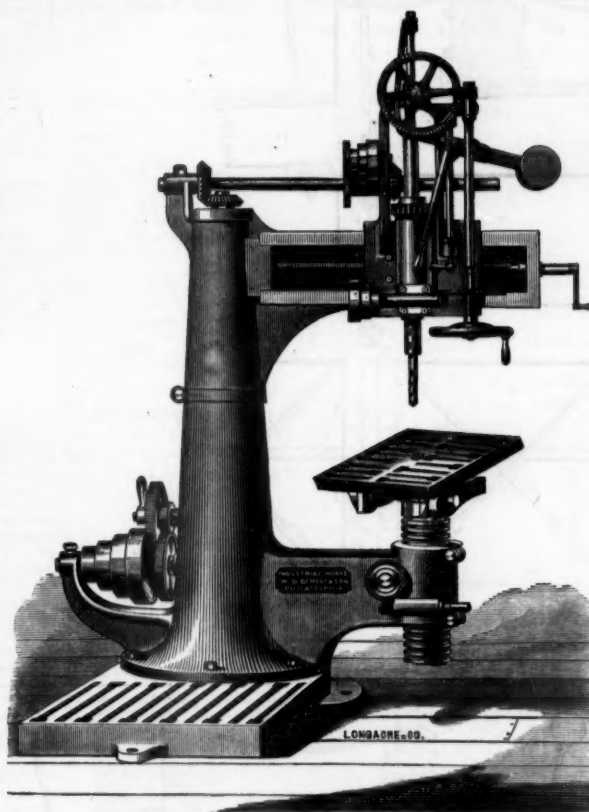
dusky & Cleveland; A. C. Bird, St. L., K., C. & N.; E. S. Babcock, Sr., E. & C.; Joseph F. Tucker, Illinois Central; Addison Hills, L. S. & M. S.; D. B. Kendall, E., T. H. & C.; J. B. Carson, T., W. & W.; J. M. Osborne, A. & G. W.; W. H. Perry, Canada Southern; M. H. Smith, L. G. S.; J. Crampton, Great Western of Canada; J. S. Cook, P. P. & I.; W. B. Goodrich, C. & V.; C. Sanders, General Freight and Passenger Agent D., L. & M.; Edgar Hill, General Freight Agent L., C. & L.; H. H. Courtright, H. & St. Jo.; D. Edwards, F. & P. M.; T. F. Oakes, K. P.; W. S. Speers, T., P. & W.; E. P. Wilson, L., P. & S. W.; H. J. Page, L., C. & L.; C. M. Stanton, S. & Ill. S. E.; George H. Smith, Assistant Freight Agent I. & St. L.; H. B. Smith, L., P. & C.; W. H. Morrison, Assistant General Freight Agent C., L. & C.; A. E. Smith, Assistant Freight Agent, Michigan Central; J. A. Grier, P. C. & St. L.; E. F. Fuller, P. C. & St. L.; I. A. Perkins, P., C. & St. L.; M. W. Gross, P., C. & St. L.; F. L. Van Alstine, General Southern Agent Union Line; L. P. Hazard, Western Freight Agent, Erie; J. H. Sterner, General Agent C., C. & L.; Nathan Stevens, General Agent Vandalia Line; J. T. R. McKay, Assistant Freight Agent L. S. & M. S.; Frank James, General Agent Pennsylvania; W. M. Sage, Assistant Freight Agent C., R. I. & P.; S. Smith, General Agent C. & A.; S. F. Gray, General Agent Union Line; George B. Edwards, Auditor Union Line; J. D. Hayes, General Manager Blue Line, J. W. Smith, General Manager Erie & North Shore; L. D. Richardson, General Manager Green Line and Kankakee Line.

A Committee on Classification was appointed as follows: William Smith, Thomas Hoops, J. B. Carson, H. C. Diehl, L. Hills, H. W. Hibbard, J. R. Reed, H. H. Courtright.

The basis of forty cents on fourth class from Chicago to New York, as at present, with the rate recommended from Nov. 10, is shown below.

At eleven o'clock the committee reported their classification, and it was accepted.

At the passenger and ticket meeting S. F. Pierson, of the Bee Line, was made Chairman, and H. C. Townsend, of the Toledo, Peoria & Warsaw, Secretary. Those present were:



IMPROVED RADIAL DRILLING MACHINE,

By Messrs. Wm. B. Bement & Son, Philadelphia.

H. C. Townsend, of the Toledo, Peoria & Warsaw; James Charlton, of the Chicago & Alton; A. Anderson, of the Jeffersonville, Madison & Indianapolis; O. P. Atmore, of the Louisville & Nashville; C. Stanton, of the Springfield & Southeastern; S. S. Parker, of the Louisville & Cincinnati Short Line; W. L. Malcolm, of the Toledo, Wabash & Western; A. C. Dawes, of the Kansas City, Council Bluffs, and Atchison & Nebraska; C. K. Lord, of the St. Louis, Kansas City & Northern; W. B. Shattuc, of the Atlantic & Great Western; R. F. Brydon, of the Ohio & Mississippi; S. F. Pierson, of the Bee Line; C. Cobb and E. A. Ford, of the Atlantic & Pacific; C. E. Follet, of the Vandalia; S. Powell, of the Chicago, Burlington & Quincy; W. P. Johnston, of the Illinois Central; E. St. John, of the Chicago, Rock Island & Pacific; Dr. W. A. Stennett, of the Chicago & Northwestern; W. A. Thrall, of the Chicago & Northwestern; F. B. Myers, of the Pennsylvania; H. C. Wentworth, of the Michigan Central; T. Penfield, of the Hannibal & St. Joseph.

Present rate. Nov. 10.

Chicago to New York.....	\$.40	\$.45
Cincinnati to New York.....	.37	.41
Indianapolis to New York.....	.38	.43
Jeffersonville to New York.....	.42	.48
Madison to New York.....	.42	.48
Evansville to New York.....	.46	.51
New Albany to New York.....	.46	.52
Louisville to New York.....	.46	.52
Cairo to New York.....	.51	.58
St. Louis to New York.....	.55	.60

Among the railroad managers in attendance were: James F. Joy, Michigan Central; A. Stone, Jr., Lake Shore & Michigan Southern; C. W. Smith, Indianapolis, Bloomington & Western; H. Scott, Jeffersonville, Madison & Indianapolis; J. N. McCullough, Pennsylvania; W. B. McKee, Vandalia Line; J. C. Cox, Toledo, Wabash & Western; J. C. McMullan, Chicago & Alton; A. J. Cassatt, Pennsylvania; T. H. Short, Cincinnati, Hamilton & Dayton; W. O. Hughtart, Grand Rapids & Indiana; Robert Harris, Chicago, Burlington & Quincy; J. C. Clark, Illinois Central; J. E. Martin, Evansville & Crawfordville.

Governor Cox presided, and Isaac H. Sturgeon was Secretary.

On the second day the freight agents appointed a committee to make a classification and rates for cotton. This committee consisted of Messrs. M. H. Smith, J. M. Osborne, H. C. Hinman, E. S. Babcock, Jr., Joseph F. Tucker, H. W. Hibbard and C. M. Stanton, who reported a basis of \$1 per 100 lbs.

from Memphis to New York, with the privilege of compressing. Following is the table:

To	Nash-ville.	Memphis.	St. Louis.	Cincinnati.
Baltimore.....	\$.82	\$.80	\$.74	\$.80
Philadelphia.....	.87	.85	.79	.85
New York.....	.92	1.00	.84	.70
Albany, Cohoes, Schenectady and Troy.....	.87	.95	.79	.85
Boston.....	.97	1.05	.89	.75
Providence.....	1.02	1.10	.94	.80

The report was adopted by the commissioners.

At the suggestion of the commissioners an executive committee of general freight agents was appointed to confer from time to time with the commissioners on all questions that may arise. This committee is composed of the following gentlemen: A. Hills, Lake Shore & Michigan Southern; James Smith, Chicago & Alton; Thomas Hoops, Michigan Central; D. S. Gray, Pennsylvania Company; John M. Osborne, Atlantic & Great Western.

The following resolution was adopted and presented to the commissioners for their decision:

Resolved, That a tabular scale be prepared of distances to all competing points as equitable as can be, to be used as a basis upon which through rates will be made to all competing points.

During the day the passenger men, with several of the managers, met the commissioners, when the latter read the rules adopted, which are given below:

1. Regulating the number of persons to go free with stock trains, and prohibiting the allowance of return passengers.
2. Prohibiting commissions, drawbacks, and rebates; regulating the loading of cars; and prohibiting the influencing of freight. The penalty for violation of any of these clauses is the discharge of the offender, whatever position he may occupy.

3. Prohibiting steamship companies selling tickets under the regular rates.

4. Each passenger is allowed 100 pounds of baggage, any excess to be charged for at the rate of 15 per cent. of first-class passenger fare for every 100 pounds. Excepted, passengers from China, Japan, the Indies and Australia.

The following are the changes made in passenger rates at the recent meeting in New York of the General Ticket and Passenger Agents' Association and submitted to the Commissioners:

	New rate.	Old rate.
Chicago to Boston, via New York.....	\$26 85	\$24 00
Chicago to Boston, via Boston and Albany road.....	25 85	24 00
Chicago to St. Paul.....	14 00	15 25
Chicago to Richmond, Va.....	24 75	24 30
Chicago to Indianapolis.....	6 75	6 85
Chicago to Louisville.....	11 25	11 35
Chicago to St. Louis.....	9 00	11 00
Chicago to Kansas City.....	17 10	18 40
Chicago to St. Joseph.....	17 50	18 40
Chicago to Omaha.....	16 00	17 00

One result of the meeting is the issue by the Western Bureau of Railroad Commissioners of the following order, dated Oct. 15.

"From and after the 1st day of November next, no officer, agent, employee or other person, on the part of any railroad company party to this contract, or any fast freight line operating over such a road or roads, shall either pay or receive any commission, drawback, rebate, or other consideration, for the sale of tickets or for the transportation of freight, loading of cars, or for their influence in directing any business to or from any railroad."

This rule is not to affect the practice of any railroad which pays its agents or employees by giving them a commission on sales of tickets over its own road alone.

"Each railroad company is hereby directed to issue a peremptory order to all its agents or employees prohibiting the giving or receiving of any commissions, etc., in violation of this rule, and notifying them that immediate discharge will follow a violation; and that all sellers of tickets require the passengers to select their own route."

"No railway line shall accept of or take up orders for tickets issued by any steamship company after the 1st day of November, 1874, except at full rates."

"Tickets shall be withdrawn from all steamship lines by orders issued immediately."

"This applies to east-bound business only."

"GEORGE B. WRIGHT, President."

The Niagara Suspension Bridge.

The following is a copy of a letter and documents published recently in *Engineering*:

Sir: I inclose herewith a copy of a report upon the condition of the Niagara Suspension Bridge, made by me last fall to the Government of Canada, in consequence of certain representations affecting the safety of that structure.

I have obtained permission from the Minister of Public Works that this report should be published; as some of the facts therein given are of interest both to the engineering profession and to the general public. Without the intervention of Government, it would have been difficult to have uncovered and examined the condition of the anchorage, upon which the safety of the structure so obviously depends. The preservative effects of hydraulic cement upon iron, even where so placed that it is sometimes wet and sometimes dry, is clearly demonstrated.

I am, with much respect, your obedient servant,
THOMAS CURTIS CLARK,
Mem. Amer. Soc. C. E., Mem. Ins. C. E.
PHILADELPHIA, June 15, 1874.

To the Hon. Minister of Public Works, Dominion of Canada:

Sir—I have the honor to report that in accordance with the instructions given me by your letter of June 21, I have made a thorough personal examination of the Niagara Suspension Bridge built by the late J. A. Roebling, C. E., and opened for public traffic in the Spring of 1855.

This bridge has been in constant daily use for more than eighteen years. The railway traffic has now reached from between 400 to 500 cars per day, over 300 being loaded, besides many extra trips of single locomotives. There is, besides, a constant travel of carriages and foot-passengers on the lower platform, but owing to the change of business caused by railways, there are not many heavy teams, and scarce any droves of cattle now crossing it.

The woodwork of the bridge when I first inspected it, June 23, 1873, was in bad condition, both from wear and tear caused by traffic and from natural decay. As the company who own it were then repairing the woodwork, and rapidly replacing the defective timbers by new ones, I thought proper to make an *ad interim* report to you dated June 23, 1873, that the bridge was safe for the loads and speed at which it was used.

I considered, however, that I should not be carrying out your purpose unless I made my examination a very thorough one. I therefore made arrangements to sink a shaft down through the clay and sufficiently deep into the rock in which the anchorage was bedded to reach the water-bearing strata, where, if anywhere, rusting might be expected. This took

some time, and it was not until the 27th of August that the anchorage was sufficiently uncovered.

I am happy to be able to state that, having removed the masonry in which the anchorage was bedded so as to expose to view the links between the points marked A and B on the section Fig. 4, I found the paint still fresh on the ironwork, and on removing it, the iron itself as perfect as when put there, and having not the slightest signs of rust. The mortar, even in contact with the iron, was saturated with moisture, and the whole foundation evidently surrounded by water-bearing strata of rock. Without the preservative effect of the cement in which the iron was encased, the iron could not have remained free from rust for a day, and the opinion of Mr. Roebeling as to the action of hydraulic cement in preventing iron from rusting is fully sustained. I therefore believe that no future apprehension need be had as to the durability and safety of the anchorage.

Doubts having been expressed as to the condition of the cables at the point where they join the anchor links, they were uncovered last year in presence of George L. Reid, Consulting Engineer of the Great Western Railway, whose report I herewith annex.

As Mr. Reid's statement that they are in good condition is so positive, I did not consider it worth while to again uncover them, and I coincide with Mr. Reid in believing that no rusting has as yet shown itself at those points. As, however, they are there considerably exposed to the action of water finding its way along the cables and between the joints of the masonry, I believe this is a critical point and one that should be carefully examined in any future inspection that may take place.

The main cables themselves appear to be perfectly pro-

main cables, whose condition is apparently as perfect as when put in place eighteen years ago.

I had one of the caps removed from the top of the towers to examine the condition of the cables, which at this point are without the serving of fine wire, which, as we have seen, perfectly protects them at other places. I found them in good condition, well covered with paint, and bright and free from rust when the paint was scratched off. I would, however, recommend that the cables be examined at these points from time to time hereafter, to be sure that their good preservation continues.

A good deal has been done during the past few years to stiffen the wooden trusses; chord pieces have been added above and below, and the truss has now probably less deflection under a passing train than when the bridge was first opened.

In his report of May 1, 1855, Mr. Roebeling states that the deflection caused by a locomotive drawing 20 loaded cars, weighing 326 tons, was 82-100th of a foot in the center.

From some observations made at my request, August 30, 1873, a similar train, weighing 326 tons, caused a deflection of 76-100th of a foot in the center, and after it had passed the center 107-100th of a foot. But as the truss was cut asunder for the purpose of putting in new floor beams, this increase of deflection of 3 inches is easily accounted for.

I shall not attempt to conceal the fact that the woodwork of this bridge has not received, during past years, the attention that it should have done. The floor-beams, upon which the safety of trains entirely depends, were allowed to remain until badly decayed. They are now nearly all replaced, and will be entirely so by October 1, 1873, at the present rate of progress.

not have been completely worn out in half the time.

Nevertheless, too much should not be expected from it, and it should not be left too long without repairs and renewals for the future. We can better show our appreciation of the labors of this eminent engineer by taking good care of his work, than by assuming that it is of that durable construction that needs no renewal, a merit he himself never claimed for it.

Finally, to recapitulate the conclusions to which I have arrived:

The anchorage is in perfect condition, and likely to remain so.

The same thing may be said of the main cables.

Frequent inspection should take place of the junction of cables with anchorages of the wire rope suspenders, particularly at their junction with stirrups, and of all parts of the woodwork, and as soon as any decay shows itself it should be promptly attended to.

The limit of weight of ten loaded freight cars, and of a speed not over five miles an hour, should be rigidly enforced.

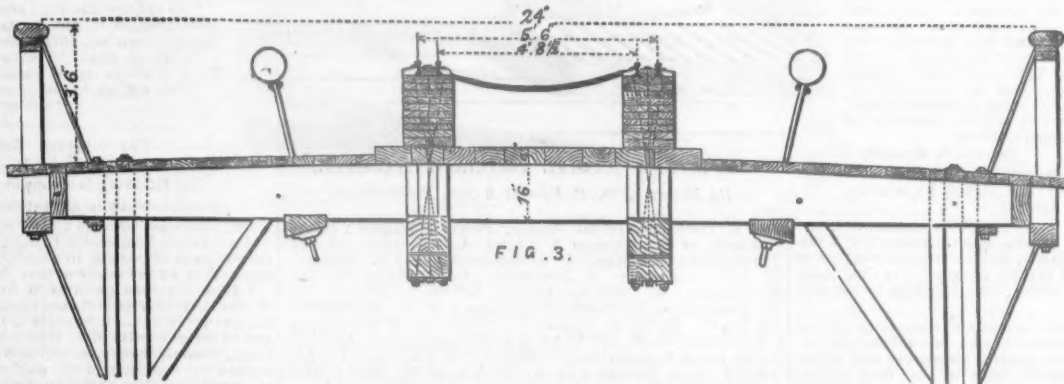
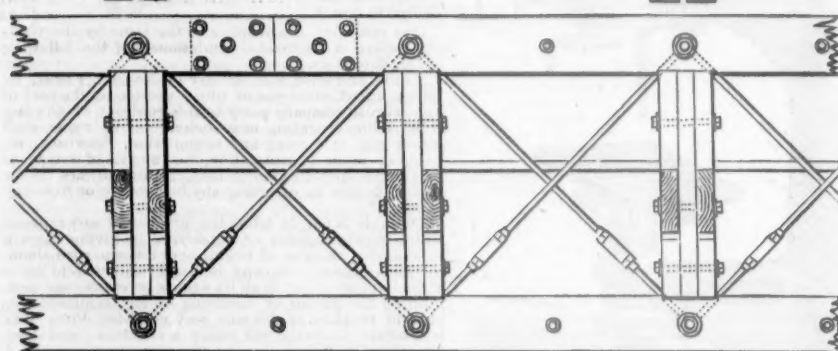
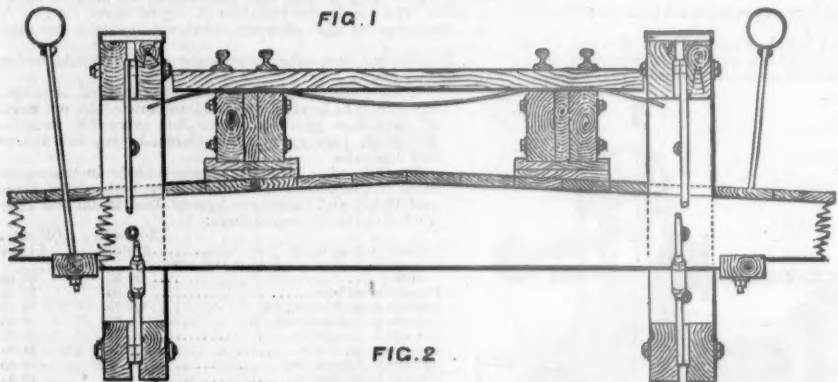
I must express my thanks to George L. Reid, Consulting Engineer, John Kennedy, Chief Engineer of the Great Western Railway, and to W. G. Swan, Esq., Superintendent of the Suspension Bridge, for the assistance rendered to me by them in making my examination and for the kindness with which they furnished me with all the information that they had, without which I should have found it difficult to make this report.

All of which is respectfully submitted by

THOMAS CURTIS CLARKE, C. E.

PHILADELPHIA, September 8, 1873.

COPY OF LETTER OF GEORGE L. REID, C. E.
W. G. Swan, Esq., Superintendent of Suspension Bridge.



ected by the wrapping of fine wire and the numerous coats of paint which cover them.

It has been thought by some persons that the effect of vibration caused by passing trains being transmitted through the cables would be injurious and impair their durability. Without discussing the intricate question of what is the ultimate effect of the changes in the molecular arrangement of iron arising from vibration, it is enough to say that the mass of these cables is so great, and their tensile strain so light, that no sensible vibration is communicated to them from passing trains. The unbroken surface of the skin of paint which covers them shows this. But this is not the case with the wire-rope stays reaching from the tops of the towers to the main trusses.

From the combined effects of expansion and contraction, severe strains and vibration, these stays are nearly all in bad condition, and some are broken entirely. The paint is cracked along the spiral lines of twist, admitting water, which causes rust. But as these stays contribute nothing at all to the strength of the bridge, I do not consider their decay as a matter of much importance.

The wire ropes which suspend the truss and all its passing loads to the main cables are also in bad condition, arising probably from the same causes, but not nearly so bad as the stays. The paint upon them is cracked, showing the destructive effect of vibration, and at the point where they enter the stirrup casting at their lower ends, a considerable amount of rusting has shown itself. As these suspenders had originally an excess of strength, I believe they are still amply strong enough, but they should be carefully inspected from time to time, and at no very distant date should be replaced by iron rods. These rods should have a means of adjustment for length, so that the tension may be uniform on all.

None of these signs of deterioration are to be seen upon the

The present arrangement of the stiffening girder immediately under the railway tracks is shown in Fig. 3, herewith annexed. This is in a decayed state and should soon be renewed. When it is renewed, I would suggest a somewhat different arrangement, as shown in Figs. 1, 2, herewith annexed. This will give greater stiffness without increasing the weight, and so far will prevent the racking of the lower truss, and prolong the life of the wooden portion of the bridge.

It will also make a safer track than the present one. As it now is, in case of any accident, such as the breaking of a wheel or axle, or even the falling of a brake block on the track, causing derailment of trains, there is nothing to prevent their falling over two feet upon the floor-beams. These beams are not strong enough to resist such a shock, and the locomotive or car would probably break through the bridge. It may be said that this has never yet happened. It is better to take such precaution as will prevent its ever happening.

The plan above suggested will do this, as the cross-ties outside the rails would receive the wheels in case of derailment, and the tops of the longitudinal girders would act as guards to prevent their going further. I would recommend this or some similar plan be carried out when the track girders are renewed. It will allow of the use of steel rails of the ordinary pattern, which cannot now be used. The life of the present iron rails is only about one year, and their renewal is a constant source of expense, not to say of danger.

The late Mr. Roebeling stated in his final report of May 1, 1855, that the flexibility of this bridge was not objectionable, and is compatible with safety and durability. Eighteen years' experience has now fully demonstrated the truth of these views. During that time at least fifty millions of tons of freight, passengers and rolling stock have passed over this bridge.

There is no Howe truss, or any form of rigid wooden framing that I know of, that would have sustained such a traffic and

Sir: I have this day made a careful examination of the seven strands forming one of the southerly pair of cables of the Niagara Suspension Bridge at the point where they are united to the anchorage chains, in the southerly anchoring (for which purpose the upper corners of masonry were removed), and I am happy to be able to report that both the wires of the strands and the ironwork of the anchor links and pins, so far as they were exposed to view by the removal of the cement surrounding them, were found to be in a perfectly sound condition; no signs of oxidation were visible.

Yours truly,
(Signed) GEO. LOWE REID,
Chief Engineer, G. W. R.

HAMILTON, November 2, 1872.

Treatment of Water to Prevent Incrustation.

Mr. E. von Haen, manufacturer of chemicals at List, near Hanover, Germany, has invented a process for purifying feed water for boilers, concerning which Professor Karmarsch, the eminent Director of the Hanover Polytechnic School, and Professors Kuhlmann and Heeren, of that institution, have made the following report, which we translate for the benefit of the readers of the RAILROAD GAZETTE:

At the request of Mr. E. von Haen, on the 7th of April last we visited his manufactory of chemicals, where he exhibited to us a process for the purification of water on a large scale, that is to say, in an iron reservoir 18 feet long by 8 ft. 10 in. wide and the same depth.

This entirely rational process depends simply on the method of freeing the water before it enters the boiler of the substances which cause incrustation, that is, carbonate of lime,

RAILROAD EARNINGS, SEPTEMBER, 1874.

Name of Road.	Mileage.					Earnings.					Earnings per mile.				
	1874.	1873.	Inc.	Dec.	Per c.	1874.	1873.	Inc.	Dec.	Per c.	1874.	1873.	Inc.	Dec.	Per c.
Atlantic & Pacific and leased lines.....	738	799	61	7%		\$498,419	\$502,087	\$3,674	0%		\$675	\$628			
Burlington, Cedar Rapids & Minnesota.	424	373	51	13%		126,295	144,901	18,606	13%		298	388			
Central Pacific.....	1,260	1,218	42	3%		1,408,000	1,407,224	776	0%		1,116	1,147			
Chicago, Danville & Vincennes.....	187	132	55	41%		71,831	72,278	447	0%		488	548			
Cincinnati, Lafayette & Chicago.....	75	78	3	4%		39,832	39,992	160	0%		531	538			
Cleveland, Columbus, Cin. & Ind.....	470	470	0	0%		369,334	459,257	89,923	24%		786	977			
Denver & Rio Grande, Main Line.....	118	118	0	0%		36,240	34,750	1,490	4%		307	294			
Illinois Central.....	1,109	1,109	0	0%		763,106	821,425	58,319	8%		688	749			
Indianapolis, Bloomington & W't'n.....	344	319	25	7%		184,199	168,454	15,745	9%		538	529			
International & Great Northern.....	458	362	96	26%		105,663	82,049	23,614	29%		231	223			
Kansas Pacific.....	761	672	89	13%		302,318	343,785	41,467	13%		397	512			
Michigan Central.....	812	787	25	3%		687,703	763,481	75,778	9%		847	970			
Missouri, Kansas & Texas.....	786	786	0	0%		334,400	399,939	65,539	19%		425	509			
Mobile & Ohio.....	522	517	5	1%		155,292	215,427	60,135	39%		297	417			
Ohio & Mississippi.....	393	393	0	0%		364,374	380,371	15,997	4%		927	968			
St. Louis, Alton & Terre H., main line.....	266	266	0	0%		111,641	126,258	14,617	13%		419	475			
St. Louis, Alton & Terre H., branches.....	71	71	0	0%		65,361	67,044	1,683	3%		778	738			
St. Louis, Iron Mountain & Southern.....	685	534	151	28%		288,447	244,967	43,480	18%		419	459			
St. Louis & Southeastern.....	349	349	0	0%		118,812	127,714	8,902	8%		340	364			
Toledo, Peoria & Warsaw.....	237	237	0	0%		107,338	127,789	20,451	19%		453	539			
Toledo, Wabash & Western.....	628	628	0	0%		459,894	593,810	133,916	29%		732	946			
West Wisconsin.....	197	197	0	0%		90,000	110,233	20,233	23%		457	560			
Totals.....	10,860	10,432	428	4%		\$6,618,216	\$7,347,283	\$729,067	11%		\$609	\$695			
Total increase or decrease.....								\$729,067							

RAILROAD EARNINGS, NINE MONTHS ENDING SEPTEMBER 30.

Name of Road.	Mileage.					Earnings.					Earnings per mile.				
	1874.	1873.	In.	Dec.	Per c.	1874.	1873.	In.	Dec.	Per c.	1874.	1873.	In.	Dec.	Per c.
Atlantic & Pacific and leased lines.....	738	799	61	7%		\$3,642,049	\$3,710,540	\$68,491	1%		\$4,935	\$4,644	\$291	6%	
Burlington, Cedar Rapids & Minn.....	424	373	51	13%		870,287	825,448	44,839	5%		2,053	2,213	160	7%	
Central Pacific.....	1,260	1,218	42	3%		10,317,903	10,198,808	119,095	1%		8,189	8,373	184	2%	
Cincinnati, Lafayette & Chicago.....	75	78	3	4%		335,129	287,595	47,534	16%		4,458	3,835	623	16%	
Cleveland, Col., Cin. & Indianap.....	470	470	0	0%		3,055,584	3,745,307	689,723	18%		6,501	7,969	1,468	18%	
Illinois Central.....	1,109	1,109	0	0%		5,690,205	6,131,473	442,268	7%		5,130	5,529	399	7%	
Indianapolis, Bloomington & W.....	344	319	25	7%		1,245,781	1,144,022	101,759	8%		3,621	3,586	35	1%	
Michigan Central.....	796	787	9	1%		5,568,596	5,593,49	24,894	0%		6,996	7,082	86	1%	
Missouri, Kansas & Texas.....	786	786	0	0%		2,304,525	2,478,980	174,455	7%		2,932	3,133	201	6%	
Mobile & Ohio.....	522	517	5	1%		1,475,159	1,935,097	459,938	31%		2,826	3,739	913	24%	
Ohio & Mississippi.....	393	393	0	0%		2,635,310	2,811,587	176,277	6%		6,718	7,158	440	6%	
St. Louis, Alton & T. H., Main Line.....	266	266	0	0%		904,474	1,066,385	161,911	18%		3,400	3,971	571	14%	
St. Louis, Alton & T. H., Branches.....	71	71	0	0%		393,744	450,206	56,462	14%		5,546	6,341	795	12%	
St. Louis, Iron Mountain & So.....	619	403	216	53%		1,874,157	1,807,745	66,412	4%		3,011	4,435	1,424	32%	
St. Louis & Southeastern.....	349	349	0	0%		921,369	977,340	55,971	6%		2,640	2,800	160	5%	
Toledo, Peoria & Warsaw.....	237	237	0	0%		826,335	938,499	112,163	14%		3,487	3,960	473	13%	
Toledo, Wabash & Western.....	628	628	0	0%		3,856,348	4,419,062	562,714	15%		6,141	7,037	896	12%	
Totals.....	8,987	8,669	318	4%		\$45,918,956	\$45,567,882	\$351,074	1%		\$5,109	\$5,062	\$469	1%	
Total increase or decrease.....								\$351,074							

"Granger" Principles.

The Patrons of Husbandry in Wisconsin are reported to have prepared a circular, which they are sending to each candidate, asking him to answer a series of 13 questions, in order that his responses may be made public for the guidance of the voters. Among these questions are the following: "Should you be elected, would you vote to sustain legislation which provided for such maximum rates of fare and freight on railroads as would allow of a reasonable compensation to the companies and not be oppressive to the people? Would you vote to sustain legislation which provides for a thorough and continuous investigation into the affairs and doings of railroad corporations by the State, and for making the results of the same public? Would you vote to sustain legislation which provided for State control over the management of railroad companies? Would your influence be exerted to sustain the legislation of this State last Winter in relation to railroads? Would you vote for such additional legislation as is required to prevent irregularities in the management of railroads? Do you believe it be inconsistent with the duty of the State Legislature to protect by ample and suitable enactments the stockholders of these semi-public corporations? Do you believe that if such protection was extended by the State it would have the effect to restore public confidence in the management of these corporations? Do you believe that in the absence of such protection there is any encouragement to invest capital in railroads at present? Do you believe that with State supervision and protection in behalf of the honest stockholders, home capital would have confidence to invest in railroad companies, and new railroad enterprises be encouraged? Would you uniformly vote for such legislation as will secure honest stockholders and creditors of any semi-public incorporated company from being robbed by the managers thereof, whether such stockholders and creditors be citizens of the United States, or citizens of Amsterdam or any other foreign place?"

Contributions.

A Suggestion.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with much pleasure parts of the "Catechism of the Locomotive" as published from week to week in the GAZETTE, and as I have admired the clearness and directness of the editor's style, I have wondered why some one cannot give us civil engineers a similar work. I have never seen any clear explanation of the so-called simple matter of "running a level," to take the first case that occurs to me.

Let our Catechism follow the topical arrangement of Vose, the accuracy of Henck and the singularly practical manner of Trautwine, and we will all test sharply, and, if correct, approve heartily.

I assume that the profession contains among its senior working members a dozen men able to do this work well.

C. E. W.

CADY'S TUNNEL, Va., Oct. 17, 1874.

Pea-nuts as an Antidote for Car-Sickness.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Some four years ago, while traveling with my wife, who was always subject to railroad seasickness, on the North-western Railway, the conductor of the Pullman car I occupied—being a friend—advised me to purchase some "baked pea-nuts" and allow my wife to eat enough to keep the taste

of the peanuts in her mouth. I did so; it cured her; and many miles she has traveled with me since, with a little basket of "baked pea-nuts." It has been a certain cure to her, also to several other ladies to whom she has mentioned it.

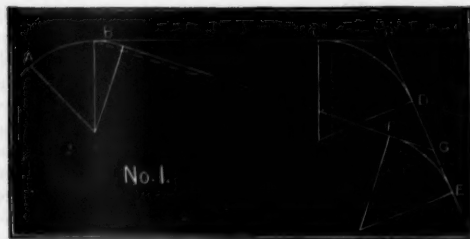
G. E. W.

Solutions of Problem in Location.

FARMWELL, Loudon County, Va., October 5, 1874.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The following is a "short process" for solving the problem of Mr. "W. W. H.," proposed in the last number of your valuable paper:

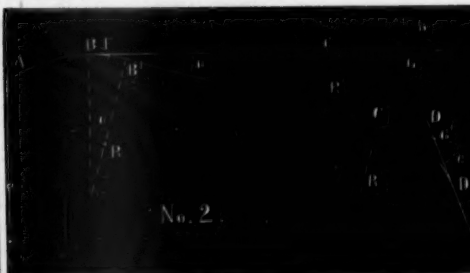


The side BA and the angles B and H are known by notes of located line. The side BC and the angle G are shortly obtained. With the angle of intersection, G , and the given radius, tangent FG is calculated as usual. Then lay off $BC - FG$ from B to F . In many cases the best method would be to run the new line to its intersection with HE , measure the angle FGD , calculate FG , and measure back to F . The state of things at B will, of course, be understood.

FARMER.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The following is a solution to "W. W. H.'s" problem in the GAZETTE of October 3, 1874:



Having located a line, $ABCE$, and finding it necessary to swing the tangent BC , to find the point C ($P. C.$), the curve CD having the same radius as CD , and terminating in the same tangent.

$$BF = R \tan. \frac{1}{2} A. FG = BG - BF.$$

$$FG' : FG :: \sin b : \sin c.$$

$$\sin b.$$

$$FG' = FG \frac{\sin c}{\sin b}.$$

$$B' C' = FG' - FB' - C' G'.$$

$$FB' = FB \quad C' G' = R \tan. \frac{1}{2} C.$$

$$B' C' \text{ is the distance required.}$$

T. J. LONG, C. E.

NEW YORK CITY, Oct. 10, 1874.

How to Keep Nuts Tight on Fish-bars.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The simplest, cheapest and best plan to keep nuts tight on fish-bar joint fastenings is—after the nuts are screwed tight—to turn up the metal of the fish-bar at the corner of the nut at the side the nut would turn in working loose. In car trucks and other machinery where the bolt has no shoulder under its head to prevent it from turning, the metal in contact with the bolt head, as well as the nut, should be burred up in the same way.

This can be easily done with the ordinary cold chisel and two or three blows of a hammer. The flat side of the nut should always be placed on the inside, and in contact with the iron and the bolt-heads made square.

If it should be necessary afterwards to take off the nut, the metal can be easily battered down; or if to tighten it, another place can be burred up. Twelve years' experience in the use of this plan on fish-bars and car trucks justifies the conclusion that there is no excuse for the rattling of fish-bars or the working loose of bolts and nuts in car trucks, where they come in contact with iron.

X.

An Inauspicious Opening.

The first passenger car which passed over the new Lowell & Andover Railroad, in Massachusetts, carried some 30 prisoners who were being transferred from the State Almshouse at Tewksbury to the Workhouse at Bridgewater, and now the employees say the road "will never have any luck," because its first passengers were paupers and thieves.

The Grant Locomotive Works.

Work at these shops was, for the present, almost entirely suspended, October 17, about 700 men out of 850 employed having been laid off. Of the Russian order 22 engines have been finished and shipped, and one of the reasons assigned for the suspension is that owing to the closing by ice of the port to which they are shipped, no more could be delivered until spring. The time for the resumption of work, it is said, depends mainly upon advice to be received from Russia. Meantime nothing very definite is made public.

Five locomotives from these works were shipped to the Canada Southern road last week.

Fast Time.

October 16, a special train on the Central Railroad of New Jersey, consisting of Engine No. 97, one baggage and two passenger cars, made the run of 74 miles from Easton to Jersey City in one hour 23½ minutes, including four stops, the actual running time being one hour 24½ minutes, making the average speed over 52½ miles an hour. It is claimed that the 16½ miles between Annandale and Somerville was run in 14½ minutes. Engine No. 97 has 17 by 23 inch cylinders, driving wheels 5 feet 10 inches diameter. The road-bed and track over which this run was made is in most excellent order, among the best in the country.



Published Every Saturday.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

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Editorial Announcements.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particularly as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

SEVENTH ANNUAL REPORT OF THE MASTER MECHANICS' ASSOCIATION.

The annual reports of this Association from the beginning have manifested an almost uniform tendency to increase in size. The number of pages of each of them is as follows, in the order in which they are given: 16, 78, 144, 106, 220, 234, and 327. It will be seen from this, that the last report is larger than that of any of the preceding conventions. It is very natural to infer from this that the size of the reports is in some measure an indication of the usefulness and influence of the Association, a deduction which may or may not be true. It is hardly necessary to say to our readers that bulk or weight may be a measure of the value of books if they are bought or sold for waste paper, but is no indication whatsoever of the value of the knowledge they contain. We make these observations not for the purpose of depreciating the value of the report before us, but in order to make as broad and clear as possible the distinction between mere bulk and quality as elements of value in the proceedings of such associations.

The first thing which will strike the reader in looking over the volume before us is the great length of the reports and papers which were submitted to the Association. The report of the "Committee on the Operation and Management of Locomotive Boilers" occupies 32 pages. In addition to this, there is a paper by Dr. Joseph G. Rogers on the same subject which occupies 12½ pages more, making 44½ pages of matter read before the convention which refers to one subject. The Report on Safety Valves occupies 18½ pages; the report and accompanying papers on a Mechanical Laboratory occupy 25 pages; that on Fuel, including table, 6 pages; Mr. Sellers' paper on the Metric System, 14 pages; the Report on Valves, 9½; on Tires, 8; on Standard Axles, ½; on Oils, 4; on Continuous Brakes, 21; on Narrow-Gauge Roads, 17;—making in all 168 pages of matter which was read before the convention. Now by actual trial it takes 2½ minutes to read a page of these reports, so that, including interruptions, over seven solid hours were spent in reading this matter to the Association, or nearly 2½ hours each day. It is no wonder then that the members grew weary, and that the last session produced a sort of feeling of oppressiveness which was so manifest among the members. It is therefore, we believe, of very great importance to the future welfare of the Association that the members should adequately realize the fact that it is almost impossible to retain the attention of an ordinary audience to the reading of

a paper longer than half an hour at a time. Even this cannot be done unless the hearers are listening to a good reader. We believe therefore that it should be an inflexible rule among all the members of committees and those who submit papers to the Association that no report or paper should occupy more than twenty minutes in the reading. It should therefore contain not more than 3,000 words. Ordinary reports can easily be condensed into these limits, if some care and skill is exercised in excluding irrelevant matter. Usually, too, if it is necessary to embody with the report statistics, letters, etc., they can be included in an appendix, so as to be printed but not read with the report. Their bearing on the conclusions of the committee can readily be pointed out in the report, and if necessary to prove certain points, any of the appendices could be read. To take an example of this, the Committee on the Operation and Management of Locomotive Boilers embodied and read with their report their circular of enquiry. Now while we believe it is quite important that these circulars should be printed with each report, as it has already been sent to each member, the reading of it before the convention seems to be quite unnecessary. The same Committee then quote entire a long paper read by Dr. Rogers before the American Association for the Advancement of Science. Of the character of its contents we desire to speak only in the highest terms, but it seems that it is hardly fair for a committee of the Master Mechanics' Association to use an entire paper of a kindred Association and embody it in the report of the proceedings of the former. Then, too, they embody with their report a number of letters of recommendation of boiler compounds, which excite the suspicion of being advertisements for some one, which they undoubtedly were intended to be by the manufacturers of those articles, although we feel equally certain that the authors of the report were quite guiltless of such intention when they included them in their report. If such documents are to be presented to the Association, at least the time of the members should be spared in hearing them read. We make these comments not because we wish to undervalue the work of this committee, the greater part of which has very great value, and which we intend to discuss more fully in a future number of the RAILROAD GAZETTE. What we are now calling attention to is the necessity of curtailing the length and condensing the matter of all such reports.

It is a fact worthy of note that whenever the members of the Master Mechanics' Association talk or write about what they have learned themselves by practical observation, they are quite sure to present valuable information to their hearers or readers; but when they undertake to contribute information which they have learned from books or other similar sources, they are quite sure to say or write what is not worth giving much time or attention to. A moment's reflection will show the reason for this. They all have unequalled opportunities of observing the operation and working of railroad machinery under all varieties of conditions and circumstances, but their opportunities and training for the reading and study of science as taught in books are not nearly so good as those of persons who devote themselves exclusively to such pursuits. If, for example, anyone should want to get information about the science of steam, he could find more information on that subject in Rankine's "Treatise on the Steam Engine" than he could learn of all the master mechanics in the country; but if he wanted to find out how scale forms in locomotive boilers, he could get more knowledge from the master mechanics than from all the books on chemistry that have ever been written. It is very much such a case as that of an eminent dentist, who also has a great love and taste for art, which at one time he gratified by devoting part of his time to modelling. While it was generally admitted that he had shown great talent in the latter direction, yet the verdict of his friends was that the time spent in the practice of the art in which he was an amateur was less productive than it would have been if it had been devoted to his profession. In other words, he was at the head of the science or art of dentistry, whereas in sculpture the sculptors would be sure to beat him. It is somewhat so with master mechanics: when they collect and contribute from their immense store of unwritten, or at least unprinted knowledge, which they have accumulated by observation and experience, they are always interesting and instructive; but when they wander into the fields of scientific research, they are seldom as wise as Tyndall or as instructive as Huxley.

The inference which we want to deduce from all this is, first, that the reports and papers submitted to the last convention were too long, and that they would serve their purpose very much better if they were more condensed, and if all documents and statistics were submitted in the form of appendices to be printed but not read; and, second, that greater effort should be made to call out discussion, and thus, if possible, get the results of the practical experience of the members, which, to use a current slang phrase, is their "strongest hold."

For the purpose of calling out intelligent and full dis-

cussion, the American Social Science Association and some other societies have adopted the plan of calling upon certain members to open the discussion after a paper or a report is read. It is believed that it would be an excellent plan if each committee of the Master Mechanics' Association should select, say four men, whose names would be given to the Chairman of the Association, who would, after the reading of the report, call upon each of them successively to discuss the subject reported on. The time allotted to each should, however, be limited to say five minutes, and after they have all been heard, the subject could be opened for general discussion. As a matter of fact, a great many subjects are passed over without discussion, simply because no one feels ready to assume the responsibility of beginning it, and the discussion of others is misdirected by the fact that some person whose ideas concerning it are very vague and loose misdirects the attention of the members to matters which are irrelevant or unimportant, after which it is difficult to recover it. The practical effect of this would also be that many men who now seldom or never speak would be called out, and once accustomed to speaking would be heard from often.

We have been led into this vein of criticism so far that there is now little room left us for comment on the Report of the favorable kind, for which there is abundant room. In fact, it has been in our hands for so short a time that there has been no opportunity to examine it with the care which it deserves, and which we propose to give it hereafter. The reports of the discussions seem to be unusually full and accurate. The engravings, with one or two exceptions, answer the purpose for which they were intended, which is, perhaps, all that is required; but the one representing the boiler used on the Pittsburgh, Fort Wayne & Chicago Railway is intolerably bad, and were it not for some similar melancholy experiences of our own, we should be inclined to jeer at the fact that the printers have maliciously inserted the engraving of the mud drum on page 47 upside down.

The discussions occupy 118 pages, but are printed in smaller type than the reports. The typography is better than that of any previous number of the annual reports. Altogether the Association has shown in this volume that, so far as its proceedings are concerned, that it still occupies the lead over all other societies devoted to the consideration of railroad interests.

THEORY AND PRACTICE.

At the last monthly meeting of the Master Car Builders' Association, a step was taken which promises, we think, to be fruitful of very excellent results to that Association. A resolution was introduced inviting Dr. W. C. Tilden, who is employed as a chemical expert by the Erie Railway Company, to read a paper at their next meeting on the "Nature and Preservation of Wood." We regret that we did not call attention to this earlier, as this number of the RAILROAD GAZETTE will not reach our readers in time to enable them to attend the meeting. Invitations have, however, been sent out to the members of that society, so that there will doubtless be a good attendance. At the same time that Dr. Tilden was invited, a resolution was adopted extending a similar invitation to Professor Thurston, of the Stevens Institute of Technology, to exhibit and explain his testing machine at a future meeting. This he has agreed to do at the one which will be held in November. The object aimed at is to bring men engaged in scientific research to meet the practical men who are members of the Car Builders' Association, and by mutual intercourse and discussion to share each other's knowledge and experience. That the effect of such intercourse will be very good there can be no doubt, provided they will meet on common ground. The meetings of this Association are very informal, and the discussions have very much the character of after-dinner conversation.

To show that the information which will be presented and discussed will probably have a practical value, we quote from a circular which we have received from Professor Thurston describing his testing machine. In this circular he gives directions for determining the following qualities in material:

"1. To determine the homogeneity of the material. 1. The elastic resistance of the specimen. 2. The resistance offered to any given amount of extension, or that producing a given set. 3. The ultimate resistance of the material. 4. The resistance of the piece within the elastic limit, i. e., the work required to produce an evident and permanent set, approximately proportional in amount to the degree of change of form of the specimen. (This quantity measures the power of the material to resist blows, and its determination is evidently quite as important as that of resistance to simple stress, which latter forms one of the factors of the former.) 5. The resilience of the material within any assumed limit of extension; i. e., the magnitude of blow required to produce a given set. 6. The total resilience or shock-resisting power of the material. 7. The effect of a load given in pounds per square inch of stress. 8. The effect of a blow or a shock, whose measure is given in inch pounds of energy, i. e., of which the work it is capable of doing is known. 9. The effect of a blow upon the material when already strained by a dead load."

It is not difficult to conceive of cases which occur in actual practice in which it is important to know to what degrees given specimens of material possess one or more of the qualities designated above.

The knowledge regarding the strength of materials has in fact been very much extended of late years, and perhaps no one has contributed to this more than Professor Thurston. It seems absolutely certain that hereafter, whenever material is intended to be used for any special purpose it will be subjected to special experiment to determine whether it possesses the qualities which are required for the purpose for which it is to be used.

It is quite singular that whenever the development of human industry in one direction creates a want than a discovery in another supplies that want. Thus when the demand for lubricating and illuminating oils began to exceed the supply which the good-natured whales had for centuries furnished, it was suddenly discovered that in some sections of Pennsylvania and Ohio it was only necessary to bore a hole into the ground and the oleaginous fluid gushed forth. So when the increased weight of trains made necessary engines so heavy as to crush iron rails, the improvements in the manufacture of steel supplied the material for tires and rails capable of resisting the loads which were required by the demands of the traffic. At present it is obvious that in order to be profitable it is absolutely necessary that railroads must be managed with the strictest and most intelligent economy. To do this, some certain means must be provided to test definitely the character and qualities of the material which is purchased. As indicated, the qualities which different materials must possess to resist different strains vary to a very great extent according to the strains to which they are subjected. It is therefore very important from an economical point of view when material is purchased to determine accurately the degree to which it possesses the required qualities. The testing machine of Professor Thurston will doubtless place in the hands at least one very efficient means of determining the strength and resistance to strains and shocks of all materials employed for such purposes, and therefore such knowledge as he and other investigators in similar fields will be able to place in the hands of railroad managers will, we believe, do much to solve the question of the economical management of railroads. A very serious source of loss at the present time in railroad operations is owing to insufficient inspection of the materials furnished to them. When, for example, bar iron is bought, no accurate or certain test is employed to determine its different qualities, but its value is left to the uncertain verdict of the general impression produced on those who manufacture it, and which they report or not as circumstances determine. Considering the immense extent to which iron and other metals are employed to resist strains of all kinds, it is evidently of the utmost importance to know the qualities which it possesses, and if a description of the machine and the investigations which Professor Thurston has made in this direction will enable master car-builders to do this it will accomplish a very desirable union of "theory and practice."

The Exhibition of the Franklin Institute.

It is now about twenty-five years since the practice of holding industrial exhibitions came into vogue in this country. Since that time they have passed through nearly all the stages of development to which popular practices and institutions are subjected. There was the early enthusiastic stage, when the whole community was full of interest in them and loud in its praises of their advantages. They were supposed to be the great forerunners of universal peace and brotherly feeling, and when the Great Exhibition was held in London in 1851, it was supposed to be the signal for a general beating of swords into plowshares and spears into pruning-hooks. Later experience, however, did not confirm the early sanguine expectations which so large a part of the community so ardently anticipated. In this country the exhibitions held in the different States and cities gradually declined in interest. The public became indifferent, and the exhibitions, instead of being directed and controlled by the most intelligent and public-spirited members of the community, fell into inefficient or corrupt hands, until the community grew wearied and in many cases disgusted with the whole system. This condition of things has existed for some years past in relation to the annual fairs of the American Institute in New York. With the exhibitions of the Franklin Institute we have been less familiar, but the fact that the exhibition this year is the first one that has been held for a number of years indicates that the people in that city had reached the indifferent stage and grown tired of such exhibitions. With this feeling we confess to having felt considerable sympathy, and we can remember distinctly the sensation of weariness produced by the interminable displays of fancy soaps, perfumery and needlework which for a long time formed so prominent if not the chief part of such exhibitions. It was therefore with some surprise and not a little pleasure that we visited the exhibition of the Franklin Institute which is now open in Philadelphia and found there one of the best displays of machinery that has ever been made in this country. The exhibition is held in the old freight depot of the Pennsylvania Railroad, which has recently been abandoned by that company. Considering the difficulty of finding a suitable building for holding such exhibitions, the Institute may, we think, congratulate itself on having found an unoccupied structure so well suited for the purpose as this is. Although it affords a great deal of room, it was found that it was not nearly large enough to supply

the demand for space made by the manufacturers of Philadelphia, and it is now filled up to overflowing.

Philadelphia being the great center for the manufacture of machine tools, the display in this branch of engineering is unusually good. Each of the celebrated firms, consisting of Messrs. William Sellers & Co., Wm. B. Bement & Son, Ferris & Miles, Edwin Harrington, Richards, London & Kelly, and Thorne, DeHaven & Co., has a good display of tools and machinery.

Taking these in alphabetical order leads us to describe the exhibit of Messrs. Wm. B. Bement & Son first. This firm shows the following machines: 1. One of their 12-in. engine lathes, the tool-rest of which slides against the front side of bed instead of on top, by which arrangement it can move past the sliding head. This form of machine is well known, and has been manufactured by this firm for a number of years past. 2. A 25-in. lathe of ordinary pattern. 3. Three of their well-known axle lathes, of which about 250 are now in use in this country. 4. A car-wheel borer, which is too well known to need further description. 5. One of their largest sized drill presses, which has a distance of 30 in. from the center of the drill to the column, so that a hole can be drilled in the center of an object 60 in. in diameter. The machine was run with a 3-in. twist drill in the spindle, which indicated the power and capacity of the machine. The table of this machine slides in one direction and swings around the column. The pattern is of the well-known graceful form, with a curved column which has been so much admired and used. 6. One of their 20-in. drill presses of the same pattern. 7. A 4-foot radial drill with a new adjustable table which can be inclined in any position, from vertical to horizontal, and is adjustable up and down. On another page we give an engraving and a fuller description of the machine. 8. A machine for making set-screws. This is of the turret pattern, which this firm has used for a number of years past. 9. A 15-in. shaping machine with travelling head and two movable tables, and an attachment for doing circular work. It is arranged so as to feed in all directions. 10. An 8-in. shaping machine with one movable table and self-feed. 11. A planing machine which will take work 30 in. wide and 6 feet long, with a new improved feed motion and driving gear. The motion of the feed is positive and without friction, and is moved, not from the table but from the driving gear, and will feed from the finest feed up to $\frac{3}{4}$ in., cut. 12. One 12-in. and one 5-in. slotting machine, with Whitworth quick-return motion instead of the elliptic wheels which have been used heretofore by this firm. 13. A bolt cutter which cuts from $\frac{3}{4}$ to $1\frac{1}{4}$ in. bolts, and with pump to feed oil on the bolt. 14. A six-spindle nut tapper. The spindles of these machines are arranged in a row and the taps are held by a clamp by which they can easily be attached and detached to remove the nuts which are out. 15. A Cotter drill for drilling key seats, etc. Specimens of the work of this machine are also exhibited, among them a shrouded pinion made out of a solid cylinder of wrought iron. These machines are intended, however, chiefly for cutting key seats in shafts. 16. A very neat nut and washer facing and turning machine, and 17. a 600 lb. steam hammer, which is exhibited at work in another portion of the building. This machine is of the well-known pattern, with the hammer head running in guides. To show the accuracy with which its action can be regulated, the American citizen of African descent who is in charge of it amused the lookers-on by driving pins into a block of wood without crushing the wood. We will have something more to say of the design and workmanship of these tools by way of comparison hereafter.

Following the alphabetical order brings us to the display of shafting by Mr. George V. Cresson, also of Philadelphia, who makes a specialty of shafting and machinery for the transmission of power. He exhibits a very full assortment of all kinds of shafting and about a dozen different kinds of hangers and pulleys. Among them is a driving shaft with tight and loose pulley especially intended for planing mills, but adapted for any position where the motion is rapid. Where a shaft revolves inside of a loose pulley, the pressure of the belt presses the pulley against the shaft, which thus soon wears the hub more on one side than on the other, or makes the hole oblong. To prevent this Mr. Cresson attaches the loose pulley to a sleeve, through which the shaft passes. This sleeve is bored out somewhat larger than the shaft, and is attached to a sort of hanger or bracket, so that the pressure of the belt does not cause it to bear against the shaft. In this way not only is there no wear of the hub of the loose pulley or of the sleeve, but there is no friction of the revolving shaft against either, so that there is no trouble in keeping the loose pulley oiled and no expense from its wear.

The fixed pulleys and also the couplings are attached to the shafting with what the manufacturer calls his "patent internal clamp hub." This is represented by fig. 1 below:



Fig. 1.

The hubs are cast with a recess, *b, b*, which leaves what may be called an open envelope, *c, c*, which partly surrounds the shaft inside of the hub. This envelope is cast with an opening, *d*, which separates the two parts, *c, c*, so that they can spring apart slightly. The hubs or couplings are bored out so as to fit the shaft accurately; and in order to put them on in the proper position, a wedge is driven into the opening *d*, which thus springs the two halves of the envelope apart and allows the pulley or coupling to be moved in any desired position. When the wedge is removed the envelope

springs back so as to clasp the shaft, and is then firmly secured to the latter by screwing down the set-screws *a, a*. Instead of the set-screws *a, a*, longitudinal tapered screws are used with the couplings. These are screwed into the cavity *b, b*, and thus force the envelope *c, c* against the shaft. This arrangement seems to be especially convenient for pulleys, which can thus be easily moved into any desired position on the shaft by simply unscrewing the set-screws and driving a wedge into the opening *d*. The bearings used in the hangers which are exhibited are all made of cast iron, with ball-and-socket joints.

Messrs. Ferris & Miles exhibit one of their 650-lb. steam hammers. The hammer-head of this machine works in guides, and is placed diagonally between them, so as to give the largest area for the dies. The valve-gear consists of a piston valve operated by a "wiper" which is suspended against the hammer-head. The machine is unfortunately not exhibited at work, so that it does not show to the best advantage. The same firm have one of their axle lathes and a new patent screw-cutting lathe on exhibition, but owing to the absence of both members of the firm, we could not get particulars of the latter and may therefore refer to these again.

Messrs. Goodell, Braun & Waters of Philadelphia, manufacturers of wood-working machinery, have on exhibition: 1. A car-mortiser and borer with variable stroke. The latter is varied from the top downward, that is, the chisel always rises to a certain point and from there can be made to descend as far as is desired. It also has a boring attachment with traverse motion. 2. They exhibit an endless-bed double-surfacing machine which planes and matches 10 in. thick; and, 3, a No. 1 planer and matcher with endless rotary bed which planes and matches four sides at once.

Messrs. Power, Tainter & Co., also of Philadelphia, show: 1. A planing-machine duster for carrying shavings, etc., from planing machines. 2. A resawing machine for splitting boards. The latter are held between two pairs of rolls which are self-centering on a pivot frame. A 42 in. circular saw made of No. 16 steel is used on this machine, which is a thinner blade than has heretofore been used for saws of this size. 3. A planer and matcher 24 in. wide; and, 4, a four-sided moulding machine for cutting wood mouldings.

The largest and finest assortment of wood-working machinery is exhibited by Messrs. Richards, London & Kelley. They show: 1. A dimension planer for planing car and other timbers. Its capacity is 28 in. wide, 18 in. thick and 10 feet long. 2. A planing and matching machine which will surface 24 in. wide 5 in. thick and tongue and groove 14 in. wide. It is fed with six feed-rolls driven by gearing. 3. A mortising and boring machine combined with an auxiliary boring attachment for car and bridge timber or other heavy work. 4. A horizontal boring machine with a table which is adjustable in any inclined position. 5. A three-spindle vertical boring machine. The spindles of this machine are all driven with a single belt and without bevel gearing. The spindles of this machine have a transverse movement crosswise of the timber, which is of a new design. 6. A reciprocating mortising machine with boring spindle. The crank shaft of these machines is in the base, thereby securing greater steadiness of motion, so that the machine can be run at a speed of 500 to 600 revolutions per minute without top braces. 6. Three ban-sawing machines of their well known design. One of these is a No. 1 machine with 36 in. wheel, one a No. 2 machine with 40 in. wheel, and the other a No. 3 with 44 in. wheel. 7. This firm exhibits a very ingenious and simple machine for setting the teeth of the band saws. This, as is known by any one who has ever tried it, is an exceedingly tedious process with any of the ordinary tools. With the machine which is exhibited it can be done in a few minutes and with an accuracy which is impossible with ordinary tools. The machine consists simply of a double hammer, somewhat of the form of an inverted letter X, as shown in fig. 2. This is suspended on a pivot at the point of bifurcation *b* on which it swings.



The saw blade is placed at *c*, between the two hammers *a, a*. The saw is supported against suitable dies, which have the proper inclination so as to give the saw-teeth the right form. The hammers are not opposite each other, but the one is Fig. 2. far enough behind the other so that one of them will strike one tooth and the other that next to it. There is a very simple feed-motion attached to it, so that every time the hammers are swung the saw is fed two teeth further forward. By this means the teeth of a band saw can be set as rapidly as the X-shaped hammer can be swung back and forth. There are also two wheels attached to a frame on which the saws are stretched while they are being set. 8. The remaining machines exhibited by this firm are a very neat pattern-maker's lathe and a circular saw for cross-cutting and ripping.

Next week we will give a further notice of this excellent exhibition and especially of the tools, etc., exhibited by Messrs. William Sellers & Co.

Record of New Railroad Construction.

This number of the RAILROAD GAZETTE has information of the laying of track on new railroads as follows:

Lowell & Andover.—Completed by the laying of $2\frac{1}{2}$ miles of track on the main line between Lowell and Ballardvale, Mass., and 1 mile on the Framingham connection. *Lake Ontario.*—Extended from Ontario, N. Y., west 12 miles. *Hanover & York.*—Track is laid from Hanover, Pa., northeastward 4 miles. *Penn Gas Coal Company's Railroad.*—Completed from the Pennsylvania Railroad at Irwin, Va., southwestward 7 miles to the Youghiogheny River. *Marietta, Pittsburgh & Cleveland.*—A branch called the *Eastern Ohio Railroad* has been completed from Point Pleasant westward 7 miles to Cumberland, O. *Chicago & Illinois River.*—Track is laid from Joliet, Ill., southwest 14 miles to the Kankakee River,

a few miles from Wilmington. *North Wisconsin*.—Extended from New Richmond, Wis., northeastward 8 miles.

This is a total of 55 1/2 miles of new railroad, making 1,180 miles completed in the United States in 1874, against 2,897 miles reported for the same period in 1873, and 5,147 in 1872.

"THE CRISIS IN INDUSTRIES" in France caused its National Assembly in July, 1873, to appoint a Commission to "proceed to a parliamentary inquiry for the purpose of ascertaining the state of French coal industry, and to inquire as to the measures which should be taken to render it able to develop production in proportion to the consumption." The Commission reported, after a most searching investigation and the collection of very full statistics, that the perturbation of industries was due to the high price of coal; that the high price of coal was caused by the unusual activity of iron industries, as indicated by the fact that the greatest rise in price was for coking coals; that the rise began in England, reached Belgium six months and France nine months later, was greatest in England and in other countries and districts, was great in proportion to their distance from the English coal fields, and that the only sufficient cause of the rise was the extraordinary demand from the United States for the construction of railroads. As we have stopped all that, and do not now make any considerable demand on foreign iron works for our railroads, there should now be no obstacle to the fall of coal to or below the old prices, and the Commission's report of ways and means to make the coal supply equal to the demand would seem to be superfluous. Certainly it is not "supply" that is needed in this country now, but demand.

THE PEANUT BOY has his existence justified by a letter, which we publish in another column, which claims that the illness similar to sea-sickness, to which many travelers by rail—ladies especially—are subject, and is commoner still among travelers in coaches, is prevented by a free indulgence in this staple of the car-pedlar. A Florida doctor used to affirm that peanuts prevent ague, which was almost equivalent to saying that the Floridians do not eat peanuts, or "goobers," as they call them; and on some routes where the North Carolina delicacy is popular and the boy energetic there should be no sea-sickness, if the nuts have the effect claimed for them.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

—The following have been admitted as members of the American Society of Civil Engineers since June: Adna Anderson, Washington, D.C.; William H. Burr (junior member), Milburn, N. J.; Elmir L. Corbush, Louisiana, Mo.; Joseph B. Davis (junior), Ann Arbor, Mich.; Edward C. Du Bois, Lima, Peru; Nathaniel M. Edwards, Appleton, Wis.; Gen. William B. Franklin, Hartford, Conn.; Schuyler Hamilton, New York; John Nader, Madison, Wis.; Robert L. Read, Indianapolis, Ind.; C. Ridgely Scott, New York; Samuel L. Smedley, Philadelphia; David McN. Stauffer, Philadelphia; Eugene Vanderpool, Newark, N. J.; Gen. G. K. Warren, U. S. A., Newport, R. I.; Joseph Wood, Washington, D. C.

—Mr. Ashbel Welch, who did such excellent service on the Committee on Rails, has been appointed a member of the Committee on Rapid Transit of the American Society of Civil Engineers in place of Mr. Buckhout, deceased.

—At the annual meeting of the New Jersey Southern Railroad Company at Long Branch, N. J., October 14, 34,751 shares were represented and the following directors elected: Nehemiah Perry, Newark, N. J.; Leon Abbott, Jersey City, N. J.; Robert Rennie, Lodi, N. J.; David P. Patterson, Hackensack, N. J.; Abraham Browning, Camden, N. J.; R. F. Stockton, Trenton, N. J.; E. C. Taylor, Elizabeth, N. J.; Charles J. Osborn, S. M. Mills, New York; Edwin Eldridge, Elmira, N. Y.; S. W. Bates, C. W. Huntington, Boston, Mass.; H. H. Cook, Bath, N. Y. The directors subsequently elected the following officers for the ensuing year: President, C. J. Osborn; Treasurer and Secretary, G. P. Morosini. Executive Committee—C. J. Osborn, S. M. Mills, Nehemiah Perry, Edward C. Taylor and Edwin Eldridge.

—An order from President Joy announces the expected appointment of Mr. W. B. Strong as General Superintendent of the Michigan Central Railroad, in place of Mr. H. E. Sargent, resigned, which took effect October 15. Mr. Sargent will, it is stated, remain with the company in an advisory position until the end of the year. Mr. H. B. Ledyard has been appointed Assistant General Superintendent, with office in Detroit.

—Mr. M. M. Miller having resigned the position of Superintendent of the Tennessee & Kentucky Division of the Mobile & Ohio Railroad and accepted that of company's agent at Columbus, Ky., Capt. G. W. Robertson is appointed Superintendent of the Division, in charge of both transportation and road departments. In the performance of his duties he will be assisted by Mr. J. S. Walker.

—The officers of the Havana, Rantoul & Eastern Railroad Company are as follows: President, Benj. J. Gifford; Vice-President, Frank White; Secretary, Guy D. Penfield; Treasurer, Sheldon Tomlinson; directors, Benj. J. Clifford, Frank White, Guy D. Penfield, Sheldon Tomlinson, Robert Fisher, Abram Cross, Theophilus P. Barnes, Philip Hummel, J. W. Fletcher, John H. Payton, Geo. W. McElroy, Ezra Dickerson. The company's office is at Rantoul, Champaign County, Ill.

—E. J. Peck has been chosen Vice-President and Wm. A. Henderson a director of the lately organized Indianapolis & Western Railroad Company.

—Mr. Guy Wells, of Keokuk, Ia., has been appointed Superintendent of the Mississippi Valley & Western Railroad.

—The directors of the Western Union Telegraph Company have chosen the following officers: President, William Orton; Vice-Presidents, A. B. Cornell, Augustus Schell, George H. Mumford, Norvin Green, Harrison Durkee; Executive Committee, William Orton, James H. Banker, Alonzo B. Cornell, Harrison Durkee, Norvin Green, Joseph Harker, Edwin D. Morgan, Augustus Schell, W. K. Thorn, C. Vanderbilt, Frank Work.

—At the annual meeting of the Rockford, Rock Island & St. Louis Railroad Company in Rock Island, Ill., October 14, Mylo Lee, Calvin Truesdale and Frederick Weyerhaeuser, the three directors whose terms have expired, were re-elected.

—At the annual meeting of the Delhi & Middletown Railroad Company in Andes, N. Y., recently, the following officers were re-elected: President, W. W. Grant; Secretary and Treasurer, Seth H. White.

—The board of directors of the Toledo, Wabash & Western Railway Company met in New York, October 17, and re-elected Gov. Jacob D. Cox, President; Mr. W. B. Corneau, Treasurer

and Secretary, and Mr. B. F. Ham, Assistant Treasurer and Secretary. The Executive Committee chosen consists of Ex-Governor J. D. Cox and Messrs. John F. Tracy, Sidney Dillon, George I. Seney and A. M. White.

—Mr. Robert W. Clarke has been appointed General Freight Agent of the Cairo & St. Louis Railroad in place of T. Whitney, resigned.

—At the annual meeting of the Valley Railroad Company at Staunton, Va., October 7, Mr. Robert Garrett was re-elected President, with the following directors: On the part of the city of Baltimore, B. T. Baldwin, Richard Norris and D. H. Miller; Baltimore & Ohio Railroad Company, Galloway Chester, Wm. Keyser and B. R. Pendleton; Staunton, M. G. Harman; Rockbridge County, Va., W. Allen and C. A. Davidson; Botetourt County, Ed. Pendleton; Roanoke County, G. W. Hansbrough.

—Mr. Charles C. Buel has been appointed Contracting Freight Agent for the Valley Fast Freight Line, which runs over the Lake Ontario, Southern Central, Lehigh Valley and North Pennsylvania roads. His office is at Oswego, N. Y.

—At the annual meeting of the Evansville & Crawfordsville Railroad Company in Evansville, Ind., October 20, the following directors were chosen: John Ingle, Jr.; Samuel Orr, J. S. Hopkins, J. E. Martin, Evansville, Ind.; L. S. French, Patoka, Ind.; J. W. Maddox, Vincennes, Ind.; Joshua Alsop, Carlisle, Ind.; H. K. Wilson, Sullivan, Ind.; Josephus Collett, Newport, Ind.; W. K. Edwards, W. R. McKee, Chauncey Rose, J. H. Turner, Terre Haute, Ind. The only new director is Mr. Collett, who replaces G. K. Steele, who declines re-election.

PERSONAL.

—Mr. Robert P. Fariss, for many years past a faithful engineer on the Mobile & Montgomery Railroad, has been presented by the company with a magnificent gold watch and chain, "for many years of faithful service."

—Mr. John Reilly, Superintendent of Transportation of the Pennsylvania Railroad, is a candidate for Congress in the Altoona (Pennsylvania) district.

—It is reported that Mr. G. H. Nettleton, now General Superintendent of the Atchison, Topeka & Santa Fe, is to have charge, as General Manager, of the Kansas City, St. Joseph & Council Bluffs, Atchison & Nebraska, Leavenworth, Lawrence & Galveston and Missouri River, Fort Scott & Gulf roads. It is also reported that he will be succeeded on the Atchison, Topeka & Santa Fe, by Mr. C. F. Morse, now of the Burlington & Missouri River in Nebraska.

—The Springfield (Mass.) Republican says that Mr. Chester W. Chapin, President of the Boston & Albany Company, who is a candidate for Congress in the Springfield District, is the strongest man in Western Massachusetts, that, being a self-made man, he is peculiarly a representative of the material property of the district, and that whether elected or not he will remain the most prominent representative of his people. It is reported that he will retire from the presidency of the Boston & Albany next February.

TRAFFIC AND EARNINGS.

—Of the total grain shipment from Buffalo during the week ending Oct. 3, 49 per cent. was by rail. During the following week 38 1/2 per cent. went by rail.

—For the week ending Oct. 10 the receipts of flour and grain at the six western lake ports, St. Louis and Peoria, amounted to 148,302 barrels of flour, 2,681,763 bushels of wheat, 819,523 of corn, and 720,102 of oats. Compared with the corresponding week of 1873 there was an increase of 28 per cent. in flour, of 90 per cent. in wheat, and of 40 per cent. in oats, and a decrease of 30 per cent. in corn. Compared with the previous week of this year, there was an increase of 5 1/2 per cent. in flour, of 2 1/2 per cent. in wheat; a decrease of 28 1/2 per cent. in corn and 11 per cent. in oats.

—Of the total flour and grain shipments from the Western lake ports during the week ending Oct. 10, 52 per cent. of the flour, less than 2 per cent. of the wheat, 10 per cent. of the corn, and 31 per cent. of the oats went by rail.

—From the 1st of August to Oct. 10, the flour and grain movement at the six Western lake ports, St. Louis and Peoria, for four years have been:

	1874.	1873.	1872.	1871.
Flour, barrels.....	1,108,551	1,214,396	1,128,336	1,445,826
Grain, bushels.....	41,165,799	53,558,028	48,302,524	51,077,359

The movement this year, therefore, is by far lighter than in any of the other three, and nearly 9 per cent. less in flour and 23 per cent. in grain less than last year.

—The earnings of the Great Western Railway of Canada for the week ending September 25 were: 1874, \$28,968; 1873, \$34,660; decrease, \$10,692, or 44 1/2 per cent.

—The earnings of the Grand Trunk Railway for the week ending September 26 were: 1874, \$44,200; 1873, \$34,200; increase, \$10,000, or 29 1/2 per cent.

—The earnings of the Atlantic & Pacific Railroad for the second week in October were: 1874, \$122,900; 1873, \$113,583; increase, \$9,318, or 8 1/2 per cent.

—The earnings of the Midland Railway of Canada for the nine months ending September 30 were: 1874, \$232,801; 1873, \$254,586; decrease, \$21,785, or 8 1/2 per cent.

—The earnings of the Toledo, Wabash & Western Railway for the first week in October were: 1874, \$106,715; 1873, \$127,899; decrease, \$21,184, or 16 1/2 per cent.

—The earnings of the Chesapeake & Ohio Canal for September were \$63,379.18; expenses, \$17,776.19; net earnings, \$45,602.99.

—The earnings of the Louisville & Nashville Railroad, Main Stem and Memphis Branch, for the year ending June 30, 1874, were:

Earnings (\$3,168 per mile).....	\$4,949,420 02
Expenses (70.3 per cent.).....	3,479,617 62

Net earnings (\$2,425 per mile).....\$1,469,802 40

—The coal traffic of the Chesapeake & Ohio Railroad for the nine months ending October 3 was 108,879 tons.

—The coal traffic of the New Jersey lines leased by the Pennsylvania Railroad Company for the nine months ending October 3 was: 1874, 907,634; 1873, 922,783; decrease, 15,148 tons, or 1 1/2 per cent.

—The earnings of the Denver & Rio Grande Railway for the first week in October were: 1874, \$8,407; 1873, \$7,713; increase, \$694, or 9 per cent.

—The shipments of iron ore and pig iron from the Lake Superior region from the commencement of the season up to October 15 were as follows:

	—1874.		—1873.	
	Ore.	Pig.	Ore.	Pig.
Marquette, tons.....	383,350	21,225	484,517	21,738
Escanaba.....	234,573	12,893	446,567	8,062
L'Anse.....	74,287	69,081
Grand Island.....	9,448
Totals.....	692,210	43,566	1,000,115	29,800

The decrease in ore shipments has been 307,905 tons, or 30 1/2 per cent., with an increase in pig of 13,711 tons, or 45 5/6 per cent. The season is now nearly closed, and most of the vessels are on their last trips.

—The earnings of the St. Louis, Iron Mountain & Southern Railroad for the second week in October were: 1874, \$86,200; 1873, \$69,683; increase, \$26,517, or 44 1/2 per cent.

ANNUAL REPORTS.

Toronto, Grey & Bruce.

This company operates a line from Toronto, Ont., northwest to Owen Sound on Georgian Bay, 117 1/2 miles, with a branch, the Bruce Extension, from Orangeville to Harriston, 47 miles. Of the line to Owen Sound, 68 1/2 miles, from Orangeville to Owen Sound, were not opened until October 1, and nine miles of the Bruce Extension was not opened until December 1. Work is in progress on the extension of the latter line from Harriston to Teeswater, 25 miles. Nine miles of the road, from Weston Junction to Toronto, is leased from the Grand Trunk, a third rail being laid, but a new line is being built, which is to be completed by the close of 1874. The road is of 3 feet 6 inches gauge.

The capital account is as follows:

Calls on stock.....	\$271,372 09
Government and municipal bonuses.....	1,104,762 50
Bonded debt (\$7,730 per mile owned).....	1,300,533 67

Total (\$16,545 per mile).....\$2,572,668 26

There is also a floating debt (bills payable) of \$469,444.43, which is partly offset by \$166,000 bonds unsold.

The operations for the year ending June 30 were as follows:

	1873-74.	1872-73.
Passengers.....	\$86,366 05	\$55,406 81
Freight.....	249,740 95	114,088 66
Mails and sundries.....	11,637 10	8,654 98
Total earnings.....	\$347,744 10	\$178,149 75
Operating expenses.....	199,191 20	124,129 69
Net earnings.....	\$148,552 90	\$54,019 86
Gross earnings per mile.....	\$2,414 96	\$2,299 00
Net earnings per mile.....	1,081 62	697 00
Per cent. of expenses.....	57.08	69.60

The average mileage worked in 1872-73 was 77 1/2 miles. The number of passengers carried during the year was 87,996. The principal items of freight were 689,686 bushels grain, 84,493 barrels flour, 1,349,221 cubic feet square timber and 23,853 cords fire wood. The traffic mileage run by engines was 358,381 miles and the average cost of train service per engine mile 27.95 cents.

The income account was as follows:

Balance from last year.....	\$705.30
Net earnings.....	148,552.90
	\$149,258.10

 Interest on funded debt.....\$93,504.97 || Interest on floating debt..... | 43,989.34 |
| | \$137,494.31 |
 Balance to current year..... | \$11,763.79 |

The equipment consists of 18 locomotives, 8 passenger and 6 mail, express and baggage cars; 229 flat, 135 box and 30 stock cars; 6 conductors' cars and 6 conductors' auxiliary and construction vans.

The line from Weston Junction to Orangeville is being relaid with 56-pound rails, and the old light rails are being used on the Bruce Extension, where traffic is lighter.

THE SCRAP HEAP.

Railroad Manufactures.

An official return places the value of railroad cars built in the United States and exported into Canada from January 1, 1873, to April 30, 1874, fifteen months, at \$259,967. The duty paid on these to the Dominion of Canada was \$39,067. The returns included 23 cars for horse or street railroads.

The Railway Equipment Trust, of Pennsylvania, has ordered a large number of cars from the shops at York, Pa.

In the rail mill of the Pennsylvania Iron Works, at Danville, Pa., October 2, the usual force of men in twelve hours and with one set of rolls, heated, rolled, sawed, hot-piled, straightened and punched 156 tons of rails.

Work in the steel department of the Joliet Iron and Steel Works was recommenced October 1. Mr. H. S. Smith is General Manager of the Works, and Mr. A. S. Dunning has charge of the converting mill and of the rail mill also. At present the rail mill is running on an order from the Chicago & Alton and turning out 70 tons of 60-pound rails per day.

The National Iron works at Danville, Pa., have been thoroughly repaired and put in operation under the management of the Hancock Steel & Iron Company.

The Pittsburgh American Manufacturer says: "Messrs. Hussey, Wells & Co. are progressing rapidly with their new steel sheet mill, and it will probably be in operation next month. The train will be 18-inch. This was the first steel concern in the country to dispense with foreign iron in the manufacture of steel."

Train Telegraph Instruments on the Lake Shore Road.

In our issue of Oct. 3, we published the following from the Detroit Free Press:

"Colonel Wheaton, Superintendent of the Kalamazoo Division of the Michigan Southern Railway, has provided the train men with a new telegraph instrument, by which connection can be made with the main line at any place, and dispatches sent. The box is not large, but it affords room for train orders, stationery, one hundred feet of wire, etc. If a train breaks down all that is necessary is to make connections with the main wire, and orders can be sent or received at once."

In relation to this an officer of the road kindly corrects and enlarges the information as follows:

"Each division has been supplied lately with an instrument case, containing telegraph key, and Bradley relay connected to posts in the outside of the case, to which wires can be instantly attached. The front of the case forms, when opened, the desk to write on, and there is a drawer for pencil and paper. This case is kept for the use of the telegrapher who accompanies a wrecking train, and enables communications to be established at once. That is all the foundation there is for this puff. Our Superintendent of Telegraph is the person to whom this sensible provision is due; and his modest name is William Kline, Jr."

A Refrigerator Car Without Ice.

An English paper describes as follows what it calls a "dead-meat wagon," invented by a Captain Acklom, and used on the Great Western Railway:

"It does not differ much in appearance from an ordinary railway wagon, and the patentee claims that it can be built at little more expense and filled on occasion with any class of merchandise. The body of the vehicle consists of a double panelling of galvanized iron network, with the space between filled with two couches of inodorous absorbent felt, the outer one four layers thick, and the inner one, an inch apart from it, but a single layer. The mesh of the external panel is much larger than the corresponding mesh inside, in order to permit free ingress to the heat and atmosphere. The inner panel alone forms a ceiling to the chamber, and is covered with the felt, but with an interval of a couple of inches between the

surface and the arched outer roof. The object of this arrangement is to admit the passage of a current of air when the van is in motion. Underneath is a tank from which water is driven by a forcing pump to a covered galvanized iron gutter, running round the edge of the roof, between the panels; the outer felt is lipped in this gutter, so that the water is bound to percolate down through it to a metal-lined groove, which returns the drip to the tank. The atmosphere coming in contact with the saturated felt causes evaporation and lowers the temperature within, while the single inner layer of dry felt preserves the meat from moisture; and of course the warmer the weather the more rapid is the evaporation, and consequently the cooler the interior."

A Fireman Who Wants to Change Work.

The Master Mechanic on one of the Chicago railroads recently received the following letter from a green fireman:

Chicago, Ill., Oct. 16.
Mr. —, you hired me a week ago as a fireman, and I am ever so much obliged to you. I think I am not treated quite fair, though. I have been running on the — with —. Beside cleaning the engine when she is in the house, I have all the work to do outside. I have to do all the coal shoveling and never get a rest. I think the old fat fellow I am with might get down and shovel sometimes and let me get up on his side and look for cows.
HENRY W.

OLD AND NEW ROADS.

Chesapeake & Ohio Canal.

At the close of September there was a balance of \$110,118 on hand and the board appropriated \$50,985 to pay the coupon on the preferred construction bonds which was due January 1, 1861. This makes \$203,940 overdue coupons paid out of the revenue of the present season. The principal of these bonds is \$1,699,500 and the overdue interest up to July, 1874, is \$1,376,595.

Houston & Texas Central.

The gauge of the Waco Branch is to be changed to 4 feet 8½ inches at the same time as that of the main line from Corsicana to Hearne. It is said that the company intends to build extensive stock-yards at Waco, and endeavor to make that a principal shipping point for the cattle trade.

Marietta, Pittsburgh & Cleveland.

A correspondent of this road writes us under date of Oct. 19 as follows:—"Under the head of 'New Road Construction' it may not be amiss to notice a completion of seven miles of track from Point Pleasant on our road to Cumberland, O. The road is known as the Eastern Ohio, and the track is laid on an old bed graded years ago, and intended to run from McConnellsville on the Muskingum River to Dennison on the Pan Handle. Of this 25 or 30 miles were graded some years ago, and the citizens of Cumberland subscribed enough to complete and iron it from their village to our road. Rails, 45 pounds to the yard; gauge, 4 ft. 8½ in. One locomotive, 1 coach, 1 box car, 1 flat."

New Orleans & Texas.

The New Orleans Chamber of Commerce has adopted resolutions urging the necessity of railroad connection with Texas, and expressing the belief that the city of New Orleans can and should build such a road. A committee has been appointed to act with committees from the Cotton Exchange and Merchants' Exchange to devise a plan. It is proposed to have the road owned by the city and managed by trustees.

Southwestern & Rio Grande.

The lessee of the Louisiana penitentiary has contracted to grade the Louisiana section of the road, and will have 350 men at work soon. He is to grade 12 miles monthly and to receive \$7,000 cash each month, the balance being payable in bonds.

Indianapolis, Bloomington & Western.

A meeting of holders of the second mortgage bonds was held in New York, October 20, at which about two-thirds of the bonds were represented. A committee, consisting of Thomas Denny, Jr., J. P. Adriance and Josiah P. Blossom, was appointed to confer with similar committees of holders of the other classes of securities, with a view to an amicable reorganization.

Oil Freights.

The rates on petroleum as finally fixed by the companies which control the approaches to the oil country are given as follows by the Titusville (Pa.) Herald: "Rates on refined oil from Cleveland, 'the Creek' and Pittsburgh, as follows:

To Boston.....	\$2 10
To Philadelphia.....	1 85
To Baltimore.....	1 85
To New York.....	1 90

"From which shall be refunded the amount paid for the transportation of crude oil by rail from the mouth of the pipe to the said refineries.

"No rebate from these rates will be paid on oil reaching refineries direct by pipes.

"Western refiners, that is, 'the Creek,' Pittsburgh and Cleveland, will be allowed to ship east, free of charge, 11½ barrels of benzine or residuum for every 75 barrels of refined oil shipped by them under the above arrangement.

"On crude oil the rates from all initial points of rail shipments in the oil regions shall be as follows:

To Boston, per barrel.....	\$1 75
To New York, per barrel.....	1 65
To Philadelphia, per barrel.....	1 60
To Baltimore, per barrel.....	1 60

From which shall be refunded 22 cents per barrel only on oil coming from pipes which maintain the agreed rate of pipeline.

"A barrel shall in all cases be computed at 45 gallons.

"It is impossible to compare the above rates with the rates heretofore charged, as the great bulk of oil shipped east the past season was shipped at rates which were never made public, each large shipper having, as we understand, some special rate of his own. It is believed, however, that this is an advance of 45 cents on a barrel of crude."

Much excitement and opposition has been caused by these new rates. The Pittsburgh, Washington & Baltimore road has begun to carry refined oil to Baltimore at eighty cents per barrel, and the Pittsburgh refiners hope, by means of their large stock of crude and by extending their pipe line connections, to make themselves independent of the combination, or at any rate to hold out until it breaks down.

Erie.

A searching examination of the accounts at all the various stations on the main line and branches is being made by two of the assistants in the Auditor's office, who are now going over the road.

In answer to a letter from the company's counsel, the Attorney General of New York says that the application for the appointment of a receiver and the dissolution of the company was put in the complaint in the Angell suit, not in the expectation that any such action would be required, but in order that it might be taken hereafter, if the conduct of the directors should make it necessary.

It is reported that the company has sold the property adjoining the machine shops in Jersey City, and has decided to make no further extension of the shops there.

The Port Jervis (N.Y.) Gazette says: "Plans have been made for new shops in Port Jervis, which were drawn last summer, we are told, with the intention of the speedy erection of the buildings. The design calls for the erection of the following buildings on the unoccupied ground known as the German-town flats: Three new round-houses with 52 stalls each; machine shop 104x600 feet; car shop 80x60 feet, with a transfer table running the entire length between the latter two shops; copper and boiler shop 80x150; storehouse 60x120; blacksmith shop 80x240; oil and waste house 40x60; wood-working and machine shop 70x200; paint shop 70x200. On the north side of the track, about where the car-repair shops now stand, the coal chutes are to be placed. The grounds now occupied by the shops, round-houses, and other buildings, will be cleared and used for tracks and switches."

Pacific, of Missouri.

The suit brought by the bondholders of this road to enjoin the Governor of Missouri from selling the road under the statutory lien of the State for moneys loaned to aid its construction, was to come up on appeal before the Supreme Court of the United States, October 21. The company claims a release from the lien of the State under the provisions of the act of 1868, which provided that in consideration of \$5,000,000, the State's lien, then amounting to \$10,000,000, should be released. It is now claimed on the part of the State that this act was unconstitutional and forbidden by the fifteenth section of the eleventh article, which provides "that the general assembly shall have no power to release the lien of the State upon any railroad for any purpose whatever." Arrangements were made last fall to advertise the road for sale, when the company applied to the United States Circuit Court and obtained an injunction, which the Court made perpetual. The State appealed to the Supreme Court, and the case is now to be heard. The decision in this case will govern a similar suit pending on the State's lien on the North Missouri (now St. Louis, Kansas City & Northern).

Great Western, of Canada.

Arrangements have been made by which through trains on this road are to run to and from Buffalo by the Erie road to Suspension Bridge, and the running of such trains by the International Bridge and Merrilton Junction is discontinued.

Railroad Taxation in Missouri.

Application has been made to the County Court of St. Louis County, Mo., for an order to collect the tax of 15 per cent, on gross earnings due from the St. Louis, Kansas City & Northern and St. Louis & Iron Mountain companies for the years 1872 and 1873. This tax was imposed on the roads by an ordinance of the constitutional convention of 1865, and its payment was resisted by the companies. The validity of the ordinance was sustained by the Missouri Supreme Court and the Supreme Court of the United States. None of the companies have ever paid any taxes under the ordinance, and the two companies named now owe under it eight years' taxes, from 1866 to 1872, and the Pacific Company six years' taxes, the latter company having been exempted by a special provision in its charter from all taxes until two years after the road was finished. Under this provision it did not become liable until 1868.

North Wisconsin.

On the extension of this road track is laid from New Richmond, Wis., northeast about eight miles, the end of the track being a short distance over the Polk County line. Track-laying has been suspended until more iron arrives from Cleveland, and meantime the road is being ballasted.

Southern Pennsylvania.

Mr. George Junkin, as master in chancery, is now taking testimony and preparing a report to the Pennsylvania Supreme Court as to the distribution of the proceeds of the property of Southern Pennsylvania Iron & Railroad Company, which was sold some time since under foreclosure of the second mortgage. The case was once tried before a master, whose report was subsequently set aside and a new master appointed by the Supreme Court. The claims amount to over \$410,000, and the amount to be distributed is about \$300,000. The road is now in the hands of a new company organized by the purchasers.

Hudson & Lake Champlain Ship Canal Survey.

Mr. G. Thomas Hall, C. E., of the State Canal Department, has just completed a survey and map for a United States Ship Canal to connect the waters of Lake Champlain at Whitehall, N. Y., with those of the Hudson River at Fort Edward.

The map, estimate and report of water supply will be embodied in the reports of Colonels Wilson and Fuller of the United States Engineer Corps, and presented to the next Congress, through the proper committee, for action thereon.

Fort Scott & Southeastern.

Work was begun on this road near Fort Scott, Kan., October 9, and a considerable force is to be put at work immediately. The road is intended to open a large extent of coal and lead country in Kansas and Missouri.

Tyler Tap.

Efforts are being made to secure stock subscriptions for this road, which is to be 21 miles long, from Tyler, Texas, northeast to the Texas & Pacific. Ward, Dowey & Co., lessees of the State penitentiary, have offered to do the grading and take the land-grant in part payment. It is proposed to build it of standard gauge, but with a light superstructure, laid with 30-pound iron and with light equipment, which is the sensible way to make a cheap railroad.

Hanover & York.

Work on this road is progressing steadily, notwithstanding the trouble with the Hanover Branch, and four miles of track has been laid from Hanover, Pa., northeast. The company has secured control of the stock of the Littlestown Railroad Company, whose road runs from Hanover southwest 9½ miles to Littlestown, and is extended thence to Frederick by the Frederick & Pennsylvania Line. The Littlestown road has been heretofore operated by the Hanover Branch Company.

South Mountain.

A force of 300 men has been kept steadily at work on the grading from Harrisburg, Pa., east by north to Hamburg. The engineers have just completed the location of the line from Hamburg eastward to the Delaware River.

Chesapeake & Ohio.

The question has been raised in Virginia whether this company has not failed to comply with the provisions of its charter, which, it was said, required it to complete the road to the mouth of the Big Sandy, and to make the terminus there. The present Ohio River terminus is some miles short of that point. It appears, however, that the charter only prescribed that within six years from the organization the company should complete the road to the Ohio River, and that the mouth of the Big Sandy or of the Great Kanawha might be selected as the terminus.

North Pacific Coast.

The California Supreme Court has decided to annul the subscription of \$100,000 to this road made by Marin County. The subscription was voted by the people and it was arranged that the road should enter San Rafael, the county seat, from the south. Subsequently, however, the route was changed so as to enter San Rafael on the west, the Board of Super-

visors consenting. The Court now decides that the intent of the law is to have the route determined by the votes, and that the Supervisors have not the power to change it.

Hanover Branch.

This company has now full control of the Gettysburg Railroad, which it has operated for some time past. The Gettysburg Company, now known as the Susquehanna, Gettysburg, & Potomac, owns about 17 miles of completed road, from Hanover, Pa., west to Gettysburg, and has moreover secured from the State of Pennsylvania the franchise and completed road-bed of what is locally known as the "Tapeworm road." The line of this road is from Gettysburg west by south to the Chesapeake & Ohio Canal at Clear Spring, Md., a distance of nearly 50 miles. This road was located in 1836, and its construction begun by the State of Pennsylvania, but abandoned after some \$800,000 had been spent on it. The work was very solidly done, with stone culverts and bridges and graded for a double track, and much of the roadbed is said to be still in fair order as far as it was completed. The heaviest grades on the line are 50 feet to the mile going west and 52.8 feet going east. The line passes through a good country and, if completed, might have some coal business from the canal.

Quebec Railroad Aid.

The members of the new government of the Province of Quebec promise in their addresses that one of the leading features of their policy will be the granting of further aid to railroads, especially to the North Shore (Quebec to Montreal), Lewis & Kennebec and Quebec & Lake St. John lines.

Grand Trunk.

A deputation of the Quebec merchants recently met the officers of this company to confer respecting the extension of the Quebec Branch from its present terminus at Point Lewis to a point more directly opposite the city of Quebec on the south shore of the St. Lawrence. It was stated on behalf of the company that the extension would be built, provided the corporation of Lewis, in which town it would lie, will give the right of way and half the expense of building the line.

Mississippi Valley & Western.

A correspondent writes us that "The portion of this road lying between West Quincy and Hannibal, Mo., has been abandoned for an indefinite period, and no trains are run over it. From West Quincy to Mississippi Valley Junction, four miles, the company had running rights over the Hannibal & St. Joseph, the rest of the way, about 15 miles, was its own track. It is stated that this part of the line has never paid running expenses."

Cairo & St. Louis.

Track-laying on this road was begun at Cairo, Ill., October 14, and the rails are now going down in both directions, from Cairo northward and from Murphysboro southward.

New Orleans, St. Louis & Chicago.

A sharp competition in rates is going on between this road and the river boats. The Cairo (Ill.) Bulletin notes shipments of a lot of corn from that place to New Orleans by rail at 17½ cents per hundred. Steamboats refuse to carry it for less than 20 cents per hundred. The distance being 545 miles, this rate is 1.15 cent per ton per mile, which might do on a railroad with heavy traffic, but will not pay expenses on the Cairo & New Orleans route, where the chief traffic is southward.

A new consolidated mortgage for \$25,000,000, covering the whole road and property of the company has been put upon record. It is made to the Farmers' Loan and Trust Company of New York as trustee and is intended to take the place of all existing mortgages on the property, and to provide for future issues of bonds, if such should be necessary.

Grain Inspection Rates at Chicago.

The Railroad and Warehouse Commission has been revising the rates to be charged for inspecting grain at Chicago, and has made a general reduction. The following table shows the present rates and the new ones which are to take place November 1:

FOR INSPECTION.		
	Present.	New.
Per car-load.....	25c.	15c.
Per 1,000 bushels from canal boats.....	35c.	25c.
Grain in bags, per bushel.....	4c.	2 mills
FOR OUT-INSPECTION.		
1,000 bushels to vessels.....	85c.	25c.
Car-load to cars.....	30c.	20c.
Car-load to teams.....	25c.	20c.
Wagon-load to teams.....	10c.	10c.

The lower rates will produce all the revenue necessary to pay the expenses of inspection, which is all that is desired.

Petersburg.

There is talk of building a branch or extension to leave this road about four miles from Weldon, N. C., and run southeast through Northampton and Bertie counties to the Roanoke at the mouth of Salmon Creek, near Albemarle Sound. This extension would be nearly sixty miles long, and would pass through a very good agricultural country.

Grand Trunk.

Mr. Potter, President of this company, recently stated that the company preferred to do its business through Portland as its seaport, but that equal shipping facilities must be provided there with those at other ports. Cars can now be run through to Boston, and the company will be obliged to send them there unless new wharf and elevator accommodations are provided at Portland. The company's means have been exhausted by the change of gauge and other improvements, and whatever is done at Portland must be done by the people of that city. About \$250,000 is required, a comparatively small sum, considering the interests involved. If this can be raised there will be no difficulty in retaining the steamship lines, which otherwise will make Boston their winter port.

Raleigh & Augusta.

Several miles of grading are under contract south of the present terminus at Sandford, N. C., and some 400 men are at work. It is said that the whole line to the crossing of the Carolina Central near Rockingham will soon be under contract.

Penn Gas Coal Company.

The track is now laid on this company's railroad, which now runs from the Pennsylvania road at Irwin, Pa., southwest to the Youghiogheny River at the mouth of the Big Sewickley. It is seven miles long and is intended for the transportation of coal. It will furnish an outlet for a large extent of coal land on which the company is now opening several mines.

Albany & Susquehanna.

The Utica (N. Y.) Herald is informed on good authority that the gauge of this road will be changed from 6 feet to 4 feet 8½ inches before the close of the year. There is already a third rail on 120 miles of the road, from Albany to Nineveh. The road is also to be relaid with steel.

Valley, of Virginia.

The annual meeting was held in Staunton, Va., October 7, when it was reported that the 26 miles of completed road between Staunton and Harrisonburg is doing a good business. On the line south of Staunton 68 out of the 87 sections are in

process of completion, and the remaining 24 are light sections, which may promptly be completed as soon as the heavier work is done. Gratifying progress is being made at the heaviest points, which are between Fairfield and Buchanan. The report also refers to the proposed branch or extension from some point in Botetourt County southwest to the Kentucky line.

Sullivan & Erie.

This road and the coal lands of the company were sold, October 14, under foreclosure of the first mortgage. The property was bought for \$25,000 by an attorney for the bondholders, who intend to organize a new company. The road is 24 miles long from Monroeton, Pa., south to Bernice, and the company owned some 5,000 acres of coal lands.

Nevada County.

Two lines have been surveyed, one passing through Grass Valley, the other through Union Hill, with a short branch to Grass Valley. The directors have resolved to locate the road from Colfax, Cal., to Nevada City on the first line, provided the Grass Valley people will give right of way through their town and depot grounds there.

Shenandoah Valley.

The Winchester (Va.) *News* speaking of the reported sale of the charter of this company to the Valley Railroad Company says: "An article in the constitution of West Virginia provides that:

"No railroad corporation shall consolidate its stock, property or franchise, with any other railroad owning a parallel or competing line, or obtain the possession or control of such parallel or competing line by lease or other contract, without the permission of the Legislature."

"North of Clarke, therefore, the transfer could not take effect, at least until Mr. Garrett could have the constitution of what has been called his 'pocket borough' amended, and the obnoxious clause stricken out. That would be necessarily a work of time."

Chicago, Portage & Superior.

The stockholders of this company (formerly the Chicago & Northern Pacific Air Line) are to meet at No. 87 Washington street, Chicago, December 2, "for the purpose of authorizing the cancellation of the bonds and the mortgage upon its railway heretofore executed, and the execution of new bonds and a new mortgage upon its railway to secure the same, to an amount not exceeding \$25,000 per mile of such railway."

Union City & Richmond.

Surveys are to be made for a new railroad from Union City, Ind., to Hollingsburg, O., and thence southward, following nearly the Ohio State line to Richmond, Ind. It will be about 28 miles long.

Davenport & St. Paul.

This company has made a new proposition to bring the road into Davenport, Ia., from its present terminus on the outskirts of the city. The company offers to build the road to Mississippi avenue within 60 days, provided \$11,000 is subscribed, the money to be payable when the road is finished.

Narragansett Valley.

The contract for the grading of this road has been let to George W. Prentice, of Providence, and it is intended to have it completed in time for next year's summer travel. It is to run from Boston Neck, B. L., by way of Narragansett Pier, Foxdale and Wakefield to a junction with the Wickford Branch of the New York, Providence & Boston road.

Dividends.

Dividends have been declared by the following companies: United States Express, \$2 per share quarterly, payable November 2.

Baltimore & Ohio, Main Stem, 5 per cent., semi-annual, payable November 2.

Baltimore & Ohio, Washington Branch, 5 per cent., semi-annual, payable October 21.

Chicago & Alton.

In the suit brought by the Wiggins Ferry Company to recover damages from this company for the alleged violation of the contract by which the Ferry company was to transport all freight and passengers from the road over the river from East St. Louis to St. Louis, the Circuit Court has appointed a referee to take testimony on the question of damages presented by the plaintiff.

Rockford, Rock Island & St. Louis.

The annual meeting was held at Rock Island, Ill., October 14, when resolutions were adopted approving the management for the past year, and instructing the officers to resist to the utmost the attempts of the German bondholders represented by Osterberg to secure possession of the road; also approving the action taken in the Nickerson suits and the appointment of Messrs. Lynde and Cable as receivers.

Delaware.

A special meeting is called to be held in Dover, Del., November 5, for the purpose of considering the terms and conditions of an agreement between the Delaware and the Philadelphia, Wilmington & Baltimore companies, providing for the guarantee, by the latter company, of an issue of bonds to the amount of \$650,000, proposed to be made by the Delaware Railroad Company, and secured by mortgage on the road, for the purpose of providing means to pay the loans falling due July 1, 1875.

The meeting is also called for the purpose of ratifying the proposed extension of the lease of the Delaware Railroad to the Philadelphia, Wilmington & Baltimore, as provided for in the original agreement.

Hanover & York.

The York (Pa.) *Daily* says: "October 10 there was some trouble at Hanover, Pa., between the officers of the Hanover Branch Company and the York Short Line. It appears that in the evening the workmen on the Short Line began work to cross the Gettysburg track, when the officers of the Hanover Branch & Gettysburg road ordered two trains, with locomotives, which ran down to Gettysburg. The Short Line workmen, being notified of their approach, attempted to tear up the track, throwing iron rails and cross ties on the track, when the train came dashing over the rails into a crowd of men who had assembled, but no one was hurt. The Short Line men, assisted by others, however, soon put the cars out of the way, and the officers of the Hanover Branch had a warrant issued charging John Young, Joseph S. Gitt, and others, with tearing up the track. When the arrest was attempted to be made a crowd of some two or three hundred men interfered and prevented the taking of a single man."

Berks County.

The Philadelphia Railroad and Mining Register of October 17 says: "This company having been adjudged bankrupt by Judge Cadwalader, application was made to him on the 9th instant for an injunction to restrain A. De Haven & Brothers, and certain other judgment creditors, from proceeding under executions issued in the Common Pleas Court of Berks County. The railroad had been advertised for sale by the Sheriff of Berks under the executions, and the injunction was appointed to prevent the sale. It was asked for by Judge Ryan, of Pottsville, and C. J. Derr, of Reading, who represent unsecured creditors to the amount of \$300,000, and it was opposed by Messrs. George F. Baer and Thomas Hart, Jr., represent-

ing judgment creditors, the amount of the judgments in the aggregate reaching the sum of \$136,624.54. The injunction was granted, it being represented that the sale under the circumstances might result in a sacrifice of the interests of both sides."

The builders of the passenger cars used on the road, Bowers, Dure & Co., of Wilmington, Del., have taken possession of their cars and removed them from the road.

California & Texas Construction Company.

A special meeting of the stockholders was held in Philadelphia, October 13, for the purpose of considering a plan submitted by the board of directors for a reorganization of the affairs of the company. The plan was presented and adopted. It provides that the Texas & Pacific Railway Company be requested to reduce its first-mortgage bonds from \$40,000 to \$20,000 a mile, and to make its land grant bond a second mortgage at \$20,000 a mile, and to issue them at 85 for the first and 40 for the second-mortgage bonds. Eighty-five per cent. of the creditors of the company have signified their acceptance of the bonds in liquidation. The road to the extent of about 350 miles is now in working condition, and is doing a good business. The earnings, it is stated, are sufficient to pay the interest on the bonds.

Intercolonial.

A contract for cars has been awarded to Harris & Son, of St. John, New Brunswick.

Prince Edward's Island.

The contract for supplying the tools and machinery needed for the repair shops at Charlottetown has been awarded to the Ontario Tool Company at Dandae, Ont.

New Mail Routes.

Mail service has been ordered over the Utah Southern Railroad from Salt Lake City to Provo, 48 miles.

Mail service has been ordered over the Suffield Branch of the New York, New Haven & Hartford road, from Windsor Locks, Conn., to Suffield, five miles.

Lowell & Andover.

A correspondent writes from Boston, under date of the 14th: "The track of the Lowell & Andover Railroad, of Massachusetts, is now completed. Distance, main line, 8½ miles; Framingham Railroad connection, one mile. You have previously reported six miles of this, which should therefore be deducted. The road is to be leased to the Boston & Maine Railroad, which will probably commence operating it about the middle of November."

The main line runs from Lowell east to a junction with the Boston & Maine at Ballardvale. Its completion will bring that company in as a competitor for Lowell business, both to Boston and eastward. The connection with the Lowell & Framingham road also brings the Boston & Maine into direct connection with the Boston, Clinton & Fitchburg system, including the line to New Bedford and New York.

The Guatemala Railroad.

The Minister of the Interior of the State of Guatemala, in his report regarding the building of a railroad from Esquipulas to the Port of San Jose, says the length of this railroad will be 32 miles, and estimating the cost at \$30,000 a mile, will require for the whole work \$960,000, of which sum \$768,000 is to be paid in cash down, and \$192,000 in bonds at 6 per cent. interest.

Chicago & Illinois River.

The track is laid from Joliet, Ill., southwest to the crossing of the Kankakee River, a distance of about 14 miles.

Chicago & Pacific.

This company is now driving piles and building trestle-work on the line through Elgin, Ill. Work is going on actively along the line from Elgin west to Byron.

Caledonia & Mississippi.

It has been resolved to postpone tracklaying until next Spring. The grading will be all finished this Fall.

Oil Creek & Allegheny River.

A meeting was held in Philadelphia, Oct. 13, for the purpose of hearing a report from the committee of bondholders previously appointed. The committee reported a resolution rejecting as incompatible with the interests and rights of the mortgage creditors of the Oil Creek & Allegheny River Railroad Company, the offer made by the President, dated August 3.

A further report was made by a majority of the committee in regard to certain matters which have hitherto engaged the attention of the bondholders, and will continue to prove an incubus upon and affect the security of the bonds. The first of these were contracts entered into by the President, allowing large rebates on freight over the road, some of which contracts are said to extend over eight or ten years; secondly, that so long as the interest is not paid on the bonds, the receiver will remain in possession of the road.

It was urged that the consolidated bondholders make a speedy foreclosure under their mortgage. A committee was appointed to confer with the managers of the road and ascertain if a satisfactory settlement of affairs can be made, after which the meeting adjourned again until October 20, without taking any decisive action on the report of the committee.

Havana, Rantoul & Eastern.

This company intends to build a line of three-foot gauge from Warsaw, Ill., on the Mississippi, nearly due east to Williamsport, Ind., on the Wabash, whence an Indiana corporation is to extend it to Union City on the Ohio line. Officers of the company state that some grading is being done from Rantoul, Ill., eastward.

Montpelier & Shelburne Falls.

Surveys have been completed for the southern end of this road, from Shelburne Falls, Mass., northward through Stratton and Londonderry to Windham, N. H., about 40 miles. It passes through a rough and thinly settled country, which, however, has much valuable timber. It is proposed to build it of three-foot gauge.

Southern, of Long Island.

This company, purchaser under foreclosure of the South Side Railroad, gives notice that coupons on South Side bonds will be paid as follows:

Coupons on the first-mortgage bonds that became due September 1, 1874, will be paid on presentation at the Ninth National Bank, New York.

Coupons on the first-mortgage sinking-fund bonds which became due May 1, 1874, will be paid on presentation at the Ninth National Bank, New York. The coupons on these bonds which will be due November 1, will be paid on that date at the same place.

Lake Ontario.

The Engineer of this road writes to us: "The track of the Lake Ontario Railroad (formerly the Lake Ontario Shore Railroad) by the new management has been extended from Ontario, the point to which trains have run the past year, 12 miles west. At Irondequoit Bay, one mile further west, it will be delayed a few days for the construction of a bridge over the outlet, after which it will at once be finished to the Genesee River, a total extension of 17½ miles. The ballasting follows close to tracklaying. The contractor for masonry at the Genesee River is at work, and early next spring is to have it ready for the superstructure, which is to be a double-track iron swing

bridge 324 feet long. The contractor for the 25 miles road west of the river has commenced work and is to have the iron laid and the road ballasted the present year. The grading and most of the masonry were nearly completed one year ago, but after remaining so long it requires a good deal of labor for completion."

Baltimore, Pittsburgh & Chicago.

The Chicago *Tribune* says: "This company has applied to the Hon. A. Gillett, Judge of the Circuit Court of Porter County, Indiana, for the appointment of three appraisers to assess the damages for the right of way across the Michigan Central road. The case was first heard at Valparaiso last Saturday, and the application was resisted by the Michigan Central on the ground that commissioners should first be appointed to fix the point and manner of crossing. After a long and able argument pro and con, the court decided in favor of the Baltimore Company, and refused to appoint the commissioners to change the location or manner of crossing, but granted the application of the Baltimore Company, and appointed the three appraisers to assess the damages for the right of way over the Michigan Central. The damages will be merely nominal, embracing simply the value of the land necessary for the right of way."

The United States Circuit Court in Chicago, October 16, dissolved the preliminary injunction restraining this company from putting in a grade crossing of the Michigan Central at Lake Station, Ind. In giving the decision Judge Drummond said that there was a grave doubt as to the jurisdiction of the Court. The injunction would not be allowed to stand, but the bill would be retained, and if it appeared hereafter that the Indiana statute had not been complied with, the injunction might be re-issued. The Court declined to make any positive order authorizing the tracks to be laid, but merely removed the prohibition. It was also intimated that a grade crossing ought to be avoided, if possible.

The Baltimore Company will, it is said, proceed to put in a grade crossing at once.

The latest advices state that the Michigan Central people had attempted to prevent the laying of the crossing by force, and the State authorities had been called on for armed assistance by the Baltimore Company.

The Governor of Indiana, on requisition of the Sheriff of the county, sent two companies of Militia to Lake Station, and the Chief Engineer and others of the Michigan Central party thereupon surrendered themselves to the authorities. The Baltimore company's men then proceeded to put in the crossing without further opposition, and it was finally completed on the evening of October 20.

Vermont & Canada.

The petition of the Central Vermont company for leave to buy and the Vermont & Canada for leave to sell this road was heard before the Vermont Chancery Court, October 12, before Chancellor Royce. Judge Shaw, of Burlington, and two prominent bondholders from Boston appeared for themselves and other holders of the guaranteed bonds of 1871 in opposition to the conveyance in the form proposed, lest their interests should be prejudiced. No opposition to the sale itself was manifested, but only the anxiety of trust creditors that their security should not be jeopardized, and all the parties craving time for preparation and investigation, the decision of the Court was reserved.

Burlington & Lamoille.

The town of Cambridge, Vt., has voted to issue \$15,000 of bonds in aid of this projected road.

Penobscot Bay & River.

The company which has taken the contract to build this road from Rockland, Me., to Bangor on the west bank of the Penobscot is known as the New York Construction Company. The contract is to grade and iron the road, the whole line to be ready for use by January 1, 1876. The price is to be \$35,000 per mile, \$5,000 in money or town bonds, and \$30,000 in bonds of the company at 80 cents on the dollar. The construction company will also furnish equipment, if desired, and lease it to the road.

Bangor & Calais Shore Line.

The New York Construction Company, which has lately taken a contract to build the Penobscot Bay & River road, has offered to build this road from Bucksport, Me., east to Calais and to equip it for \$20,000 per mile, the gauge to be 3 feet 6 inches. Payment is to be made one-quarter in money, the rest in bonds of the company, which are to be taken at 85.

Springfield & Long Meadow.

Private subscriptions to the stock have reached \$50,000, the amount required to secure the Springfield city subscription of \$150,000. The formal organization will take place shortly, and then the road will be located at once and all preparations made to build it early in the spring.

Montpelier & Wells River.

At the adjourned meeting, October 6, the stockholders voted to transfer the road to the bondholders, on condition that the latter, within six months from the transfer, shall pay the floating debt, not exceeding \$52,501, and the indebtedness on the equipment.

Gulf, Colorado & Santa Fe.

A call has been made for the third installment of 5 per cent. on the stock of this company, which is payable immediately.

Chicago, Dubuque & Minnesota.

The Chicago, Burlington & Quincy Company, which is to lease and complete this road under the terms of the agreement with the bondholders, has let the contract for the wooden bridges and trestles on the extension of the Turkey River Branch from Elkport, Ia., to Fayette to Manuel & Smith, of La Crosse, Wis. A contract for 13 Howe truss bridges has been awarded to Wells, French & Co., of Chicago. The extension will be about 24 miles long.

Suit has been brought by some of the contractors to recover damages for superseding the contracts made some time ago by the lesser company and re-letting the work to other parties at lower rates.

Gilman, Clinton & Springfield.

In the suit of Kelly and others against this company, a master in chancery has been appointed to take testimony on three points and report to the Court. The questions are: whether the \$1,400,000 stock held by the Morgan Improvement Company is legal and valid stock; what property, if any, is held in trust for the company by any of its officers; whether the contract with the Barclay Coal Company is a good and legal contract.

Vermont Railroads.

The St. Albans (Vt.) *Messenger* gives the following abstract of the biennial report of the Railroad Commissioner of Vermont, who, however, is an officer of very limited powers, and whose reports in consequence contain very little information:

"Railroad Commissioner Bailey reports that the cost of constructing and equipping railroads in Vermont has been \$50,000,000. The number of miles of track is nearly 1,500, being an increase of 1,300 in 25 years. He suggests that their real estate be taxed upon a fair valuation with other real estate; advises that the Commissioner be authorized to inquire whether railroad officials make any attempt to control the votes of their employees, and if so recommends appropriate

legislation to prevent the same; and also recommends legislation to prevent extortion on the part of car companies. The expenses of the Central Vermont, the last two years, have been \$5,368,459 and the receipts \$6,809,011. The Portland & Ogdensburg reports operating expenses at \$143,439.20 and receipts \$153,608.53. The Connecticut & Passumpsic Rivers report expenses at \$1,089,676.12 and receipts \$1,574,741.64. The Harlem Extension presents no report.

Union Pacific.

The commission, consisting of James Moore, Ira L. Merriam and J. L. Delano, which was appointed to examine this road and report whether the deficiencies reported by the commission of 1869 have been supplied and whether the road is completed according to law, has completed its labors and submitted a report, dated October 7. The report says that the report of the former commission was made soon after the joining of the rails at Promontory, and before the commission or company had the experience required to determine what material in the peculiar climate of the country was actually necessary to bring the road up to the standard required by law. The former commission felt this embarrassment, and referred to it in their report. In most cases the expenditures of the company in the items reported by the former commission have far exceeded their estimate. The present commission has found it impossible to ascertain whether the exact amounts advised by the former commission have in all cases been expended in the precise localities indicated, particularly as regards the improvement of the water-ways. The commission has been compelled to make a somewhat general comparison of expenditures actually made with those which were estimated to be necessary. The aggregate result is as follows: Estimated deficiency by report of eminent citizens, \$1,880,100; actually expended by Union Pacific Railroad Company, \$3,596,975.79; excess of actual expenditures over estimates, \$2,215,975.79. The company in almost all cases complied faithfully with the recommendations of the former commissions. The only exception worthy of note is in the building of the machine shops at Evanston, in Wyoming Territory, instead of at the junction. This change was caused by the inability of the road to obtain property at the junction until a very recent date. Experience has demonstrated the Evanston location to be much more desirable. These shops have cost more than three times the amount estimated by the former commission. The commission was instructed "to give full and exact information as to the present condition of the road." In obeying this instruction several pages of the report are given to a statement concerning its location, the Missouri River Bridge, the road-bed, tunnels, snow fences, snow sheds, the tracks, the water supply, and other subjects. The length of the straight line or tangents of the road is 887 1/4 miles, and of the curved lines 148 1/2 miles. The maximum grade of the road is 90 feet per mile, and its sharpest curve is six degrees. The road bed in bank is 14 to 16 feet in width. Two hundred miles of the track have been raised from two to five feet, which dispenses with the need of snow sheds and fences for that distance. All the truss bridges appear to be sound and capable of sustaining any required weight. The wooden truss bridges are renewed by combinations of wood and iron. Many of the small trestles and culverts have been replaced by stone structures. The company is endeavoring, by raising the track and widening the cuts, to dispense entirely with snow fences and sheds. The track throughout is in excellent condition. The chair joints are being rapidly replaced by fish-plates. At Laramie the company is erecting extensive rolling mills to roll their own rails. Since 1869, 2,000,000 of new ties have been placed on the track, and 400,000 more are now ready to use. All cotton-wood ties have been replaced by pine and oak. The sidings are ample. The ballasting is in good condition, station and freight houses are of good quality and ample in size. The water supply is ample, several additions to the tanks and wells having been made since 1869. The machine-shops are capable of meeting double the requirements of the company at the present time. The equipment is first class, and fully up to the present requirements of the road. The Commissioners were instructed, if they found the road completed as required by law and departmental instructions, to ascertain as nearly as practicable the date of such completion. They find that the replacing of some of the high trestles recommended by the former commission was finished in the month of September last, and they report therefore that the road was completed on the 1st of October, 1874, at a total cost, as shown by the company's books, of \$115,214,587.79, an average of \$115.21 per mile. The report concludes as follows:

"We consider the road, as built, a first-class railroad, fully complying with its charter and with the requirements of the law, and in accordance with the instructions of the department furnished to us. The shops and round-houses are of brick and stone, its machinery all of the latest and most approved pattern, its locomotives and rolling stock ample and in excellent condition. Its passenger trains are well appointed and first-class, giving ample accommodation to the travel. Its structures are fast becoming permanent, iron being substituted for wood and stone, and, if the present policy of the road is continued, it will be but a short time before the maintenance of the road-bed will be reduced to the minimum. Its cheap fuel, and the effort being made by the company to develop the resources of the country through which it runs, will develop the local travel and traffic, and add largely to its tonnage and earnings. The condition of the road, its order and discipline, and the evident close attention to details, not only show ability on the part of the general officers, but reflect great credit upon the local management, its superintendent and assistants."

The Secretary of the Interior will now have to consider the report, and if he determines to accept it as evidence of the completion of the Union Pacific Railroad according to law, he will order the issue of the land patents that have been withheld. This would enable the company to give good titles to settlers, and would also subject the lands to State and local taxation.

North Pacific Coast.

The agreement for the lease of the San Rafael & San Quentin road has been completed. The lease is for 99 years, and the lessee agrees to make a certain number of trips each day, to reduce rates and to pay off the floating debt. The gauge of the road will be changed to three feet at once.

Indianapolis, Bloomington & Western.

Holders of first-mortgage bonds of the Danville, Urbana, Bloomington & Pekin Company, which was merged in the Indianapolis, Bloomington & Western by consolidation, are requested to send their names and addresses to R. A. Dow, No. 20 Broad street, or A. Corbin, No. 61 Broadway, New York, with a view to united action for the protection of their interests.

Mr. O. H. Williams, representing several large holders of bonds, has issued a circular containing a copy of a formal demand addressed by him to the management of the company for a careful, impartial and searching investigation of the affairs of the company. The bondholders represented state that they have no sufficient data to warrant them in consenting to make a loan of two and a half years' interest to the company for seven years, and in giving up for that time their rights as bondholders. Pending such an investigation they do not intend either to accept or reject the funding proposal. As to that they will be governed by the results of the examination. They have selected as a committee Thomas Denny, Jr., of the well-known firm of Thomas Denny & Co., New

York; John P. Adriance, of Adriance, Platt & Co., Poughkeepsie, N. Y., and Frank Shepard, of Greenwich, Conn., a large investor. Holders of all classes of bonds are invited to join in the demand for an investigation.

Atlantic & Pacific.

The following statement of the present relations of this company with its bondholders is made: On the first-mortgage, Central Division bonds, of which \$1,200,000 are outstanding, no default has ever been made.

Of the \$3,000,000 mortgage, due 1888, there are \$2,829,000 outstanding. It is proposed to fund the coupons on these for 1874 and 1875, to which holders of \$1,986,000 have consented.

Of the second-mortgage bonds, \$2,015,500 are outstanding. It is proposed to fund coupons for three years, 1874, 1875 and 1876 on these bonds, and holders of \$1,660,000 have consented.

For the interest-bearing scrip the company offers plain (unsecured by mortgage) 6 per cent. bonds, interest for five years, at the option of the company, payable in the same bonds. Holders of \$1,204,491.95 out of \$1,718,438.36 have agreed to the exchange.

It is believed that nearly all the coupons will be funded as asked by the company.

Burlington & Southwestern.

The newly appointed receiver is ordered by the Court to complete the road to Stanley City, Mo. To do this and pay off the mechanics' liens and judgment debts, he is authorized to issue bonds to the amount of \$1,000,000.

Great Western of Canada.

This company offers for sale 10,000 tons old rails, 450 tons fish-plates, spikes, etc., 1,350 tons old car wheels and a large quantity of wrought, cast and steel scrap and other refuse material, besides a number of second-hand tools. Proposals will be received at the General Manager's office, Hamilton, Ont., up to November 9.

St. Joseph & Topeka.

A decree of foreclosure of mortgage and an order of sale of this road was made September 26. G. H. Hall was appointed a referee to ascertain the names of the owners of the bonds with the sums due each, and report the same to the Court. He gives notice that he will begin to take testimony at Troy, Kan., November 2.

Illinois Central.

It is stated that many improvements are to be made on the road and that it is to be put in the best possible condition. On the Iowa Division the road-bed is to be improved and some of the heavier grades cut down, and it is proposed to extend the Cedar Falls & Minnesota line northward about 15 miles to Ramsey, Minn., to secure a share in the lumber business from the Milwaukee & St. Paul and Southern Minnesota.

Chicago & South Atlantic.

It is stated that a contract has been let for the grading from Dyer, Ind., on the Joliet Division of the Michigan Central north to Englewood. The contractors are Gurches & Co.

Proposals for Steel Rails.

The Department of Public Works of the Dominion of Canada advertises for proposals for steel rails in lots of not less than 5,000 tons. Tenders must be addressed to F. Braun, Secretary, Ottawa, Can., and will be received up to November 16. Tenders must state the name of the maker and the price per ton (2,240 pounds) delivered on the wharf at Montreal during the season of navigation of 1875, the last delivery to be not later than October 1. The weight of the rails is to be 90 tons to the mile of road, or about 57 pounds per yard. The rails are for the Intercolonial road.

The Lost Palace Car.

BY E. E. HALE.

(From the Ingham Papers.)

"Passengers for Philadelphia and New York will change cars."

This annoying and astonishing cry was loudly made in the palace car "City of Thebes" at Pittsburgh, just as the babies were well asleep, and all the passengers adapting themselves to a quiet evening.

"Impossible!" said I mildly to the "gentlemanly conductor," who beamed before me in the city of gilt lace upon his cap, and the embroidered letter "C. G." These letters do not mean, as in French, "to take leave," for the peculiarity of this man is that he does not leave you till your journey's end; they mean, in America, "Pullman's Palace Car." "Impossible!" said I. I bought my ticket at Chicago through to Philadelphia with the assurance that the palace car would go through. This lady has done the same for herself and her children. Nay, if you remember, you told me yourself that the City of Thebes was built for the Philadelphia service, and that I need not move my hat, unless I wished; till we were there.

The man did not blush, but answered in the well-mannered tone of a subordinate used to obey. "Here are my orders, sir; telegram just received from headquarters. City of Thebes is to go to Baltimore. Another palace, here, sir, waiting for you." And so we were transhipped into such chairs and berths as might have been left in this other palace, as not wanted by anybody in the great law of natural selection; and the City of Thebes went to Baltimore, I suppose. The promises which had been made to us when we bought our tickets went to their place, and the people who made them went to theirs.

Except for this little incident, of which all my readers have probably experienced the like in these days of travel, the story I am now to tell would have seemed to me essentially improbable. But, so soon as I reflected, that in truth these palace cars go hither, go thither, controlled or not, as it may be, by some distant bureau, the story occurred to me as having elements of verisimilitude which I had neglected before. Having occasion, nearly at the same time, to inquire at the Metropolitan station in Boston for a lost shawl which had been left in a Brookline car, the gentlemanly official told me that he did not know where that car was; he had not heard of it for several days. This again reminded of "The Lost Palace." Why should not one palace, more or less, go astray when there are thousands to care for. Indeed, had not Mr. Firth told me at the Albany, that the worst difficulty in the administration of a strong railway is that they cannot call their freight cars home? They go astray on the line of some weaker sister, which finds it convenient to use them till they begin to show a need for paint or repairs. If freight cars disappear, why not palace cars? So the story seems to me of more worth, and I put it upon paper.

It was on my second visit to Melbourne that I heard it. It was late at night, in the coffee-rooms of the Auckland Arms, rather an indifferent third-class house, in a by-street in that city, to which, in truth, I should not have gone had my finances been on a better scale than they were. I laid down at last an old New York Herald, which the Captain of the Osprey had given me that morning, and which, in the hope of home news, I had read and read again to the last syllable of the "personals." I put down the paper as one always puts down an American paper in a foreign land, saying to myself, Happy is that nation whose history is unwritten. At that moment,

Sir Roger Tichborne, who had been talking with an intelligent looking American on the other side of the table, stretched his giant form, and said he believed he would play a game of billiards before he went to bed. He left us alone; and the American crossed the room and addressed me.

"You are from Massachusetts, are you not," said he. I said I had lived in that State.

"Good State to come from," said he. "I was there myself for three or four months—four months and ten days precisely. Did not like it very well; did not like it. At least I liked it well enough; my wife did not like it; she could not get acquainted."

"Does she get acquainted here," said I, acting on a principle which I learned from Scipio Africanus at the Latin school, and so carrying the war into the enemy's regions promptly. That is to say, I saw I must talk with this man, and I preferred to have him talk of his own concerns than of mine.

"Oh, sir! I lost her. I lost her ten years ago—lived in New Altonna then. I married this woman the next autumn in Vandalia. Yes, Mrs. Joslyn is very well satisfied here. She sees a good deal of society, and enjoys very good health."

I said that most people did who were fortunate enough to have it to enjoy. But Mr. Joslyn did not understand this bitter sarcasm, far less resent it. He went on with sufficient volubility to give to me his impressions of the colony—of the advantages it would derive from declaring its independence, and then from annexing itself to the United States. At the end of one of his periods, goaded again to say something, I asked why he left his own country for a colony, if he so greatly preferred the independent order of government.

Mr. Joslyn looked round somewhat carefully, shut the door of the room in which we were now alone—and were likely, at that hour of the night, to be alone—and answered my question at length, as the reader will see.

"Did you ever hear of the lost palace?" said he, a little anxiously.

I said no; that with every year or two I heard that Mr. Layard had found a palace at Ninevah, but that I had never heard of one's being lost.

"They don't tell of it, sir. Sometimes I think they do not know themselves. Does not that seem possible?" And the poor man repeated this question with such eagerness, that in spite of my anger at being bored by him my heart really warmed toward him. "I really think they do not know. I have never seen one word in the papers about it. Now they would have put something in the papers—do you not think they would? If they knew it themselves they would."

"Knew what?" said I, really started out of my determination to snub him.

"Knew where the palace is; knew how it was lost."

By this time, of course, I supposed he was crazy. But a minute more dispirited that notion; and I beg the reader to relieve his mind from it. This man knew perfectly well what he was talking about, and never, in the whole narration, showed any symptom of mania; a matter on which I affect to speak with the intelligence of the "experts" indeed.

After a little of this fencing with each other, in which he satisfied himself that my ignorance was not affected, he took a sudden resolution, as if it were a relief to him to tell me the whole story.

"It was years on years ago," said he. "It was when they first had palaces."

Still thinking of Nimrod's palace and Priam's, I said that must have been a great while ago.

"Yes, indeed," said he. "You would not call them palaces now, since you have seen Pullman's and Wagner's. But we called them palaces then. So many looking-glasses, you know, and tapestry carpets, and gold spit-boxes. Ours was the first line that ran palaces."

I asked myself, mentally, of what metal were the spit-boxes in Semiramis' palace; but I said nothing.

"Our line was the first line that had great. We were running our lightning express, on the 'Great Alleghanian.' We were in opposition to everybody, made close connections, served supper on board, and our passengers only were sure of the night boat at St. Louis. Those were the days of river-boats, you know. We introduced the palace feature on the railroad; and very successful it was. I was an engineer. I had a first-rate character, and the best wages of any man on the line. Never put me on a dirt-dragger, or a lazy freight loafer, I tell you. No, sir! I ran the expresses, and nothing else, and lay off two days in the week, besides. I don't think I should have thought of it but for Todhunter, who was my palace conductor."

Again this IT, which had appeared so mysteriously in what the man said before. I asked no question, but listened, really interested now, in the hope that I should find out what IT was; and this the reader will learn. He went on, in a hurried way:

"Todhunter was my palace conductor. One night he was full, and his palace was hot, and smelled bad of whale oil. We did not burn petroleum then. Well, it was a splendid full moon in August; and we were coming down grade, making the time we had lost at the Brentford Junction. Seventy miles an hour she ran, if she ran one. Todhunter had brought his cigar out on the tender, and was sitting by me. Good Lord! it seems like last week."

"Todhunter says to me, 'Joslyn,' says he, 'what's the use of crooking all round these valleys, when it would be so easy to go across?'"

"You see, we were just beginning to crook round, so as to make that long bend there is at Chamoguin; but right across the valley we could see the stern lights of Fisher's train: it was not more than half a mile away, but we should run eleven miles before we came there."

I knew what Mr. Joslyn meant. To cross the mountain ranges by rail, the engineers are obliged to wind up one side of a valley, and then, boldly crossing the head of the ravine on a high arch, to wind up the other side still, so that perhaps half an hour's journey is consumed, while not a mile of real distance is made. Joslyn took out his pencil, and on the back of an envelope drew a little sketch of the country; which, as it happened, I still preserve, and which, with his comments, explains his whole story completely. "Here we are," said he.

"This black line is the great Alleghanian—double track, seventy pounds to the yard; no figuring off there, I tell you. This was a good straight run, down grade a hundred and seventy-two feet on the mile. There, where I make this X, we came on the Chamoguin Valley, and turned short, nearly north. So we ran wriggling about till Drums here, where we stopped if they showed lanterns—what we call a flag station. But there we got across the valley, and worked south again to this other X, which was, as I say, not five-eighths of a mile from this X above, though it had taken us eleven miles to get there."

He had said it was not more than half a mile; but this half-mile grew to five-eighths as he became more accurate and serious.

"Well," said he, now resuming the thread of his story, "it was Todhunter put it into my head. He owns he did. Todhunter says, says he, 'Joslyn, what's the use of crooking round all these valleys, when it would be so easy to go across?'"

"Well, sir, I saw it then, as clear as I see it now. When that trip was done, I had two days to myself, one was Sunday; and Todhunter had the same; and he came round to my house. His wife knew mine, and we liked them. Well, we fell talking about it; and I got down the Cyclopaedia, and we found out there about the speed of cannon-balls, and the direction they

had to give them. You know this was only talk then; we never thought what would come of it; but very curious it all was."

And here Mr. Joslyn went into a long mathematical talk, with which I will not harass the reader, perfectly sure, from other experiments which I have tried with other readers, that this reader would skip it all if it were written down. Stated very briefly it amounted to this: In the old-fashioned experiments of those days, a cannon ball traveled four thousand and one hundred feet in nine seconds. Now, Joslyn was convinced, like every other engineer I ever talked to, that on a steep down grade he could drive a train at the rate of a hundred miles an hour. This is thirteen hundred and fourteen feet in nine seconds—almost exactly one-third of the cannon ball's velocity. At those rates, if the valley of Chamoguin were really but five-eighths of a mile wide, the cannon ball would cross it in seven or eight seconds, and the train in about twenty-three seconds. Both Todhunter and Joslyn were good enough mechanics and machinists to know that the rate for thirty-three hundred feet, the width of the valley, was not quite the same as that for four thousand feet; for which, in their book, they had the calculations and formulas. But they also knew that the difference was to their advantage, or the advantage of the bold experiment which had occurred to both of them, when Todhunter made his very critical suggestion.

The reader has already conceived the idea of this experiment. These rash men were wondering already whether it were not possible to leap an engine flying over the Chamoguin ravine, as Eclipse or Flying Childers might have leaped the brook at the bottom of it. Joslyn believed implicitly, as I found in talk with him, the received statement of conversation, that Eclipse, at a single bound, sprang forty feet. "If Eclipse, who weighed perhaps one thousand two hundred, would spring forty feet, could not my train, weighing two hundred tons, spring a hundred times as far?" asked he triumphantly. At least, he said that he said this to Todhunter. They went into more careful studies of projectiles, to see if it could, or could not.

The article on "Gunnery" gave them just one of those convenient tables which are the blessing of wise men and learned men, and which lead half-trained men to their ruin. They found that for their "range," which was, as they supposed, eleven hundred yards, the elevation of a forty-two pounder was one degree and a third; of a nine-pounder, three degrees. The elevation for a railway train, alas! no man had calculated. But this had occurred to both of them from the beginning. In descending the grade, at the spot where, on his little map, Joslyn made the more westerly X, they were more than eleven hundred feet above the spot where he had made his second, or easterly X. All this descent was to the advantage of the experiment. A gunner would have said that the first X "commanded" the second X, and that a battery there would inevitably silence a battery at the point below.

"We need not figure on it," said Todhunter, as Mrs. Joslyn called them in to supper. "If we did, we should make a mistake. Give me your papers. When I go up, Monday night, I'll give them to my brother Bill. I shall pass him at Faber's Mills. He has studied all these things, of course; and he will like the fun of making it out for us." So they sat down to Mrs. Joslyn's waffles; and, but for Bill Todhunter, this story would never have been told to me, nor would John Joslyn and "this woman" ever have gone to Australia.

But Bill Todhunter was one of those acute men of whom the new civilization of this country is raising thousands with every year, who in the midst of hard hand-work, and a daily duty which to collegians, and to the ignorant men among their professors, seems repulsive, carry on careful scientific study, read the best results of the latest inquiry, manage to bring together a first-rate library of reference, never spend a cent for liquor or tobacco, never waste an hour at a circus or a ball, but make their wives happy by sitting all the evening, "figuring," one side of the table, while the wife is hemming napkins on the other. All of a sudden, when such a man is wanted, he steps out, and bridges the Gulf of Bothnia; and people wonder, who forget that for two centuries and a half the foresighted men and women of this country have been building up, in the face of the Devil of Selfishness on the one hand, and of the Pope of Rome on the other, a system of popular education, improving every hour.

At this moment Bill Todhunter was foreman of repair section number eleven on the "Great Alleghanian"—a position which needed a man of first-rate promptness, of great resource, of good education in engineering. Such a man had the "Great Alleghanian" found in him, by good luck; and they had promoted him to their hardest-worked and best-paid section—the section on which, as it happened, was this Chamoguin run, and the long bend which I have described, by which the road "headed" that stream.

The younger Todhunter did meet his brother at Faber's Mills, where the repair train had hauled out of the way of the express, and where the express took wood. The brothers always looked for each other on such occasions; and Bill promised to examine the paper which Joslyn had carefully written out, and which his brother brought to him.

I have never repeated in detail the mass of calculations which Bill Todhunter made on the suggestion thus given him. If I had, I would not repeat them here for a reason which has been suggested already. He became fascinated with the problem presented to him. Stated in the language of the craft, it was this:

"Given a moving body, with a velocity eight thousand eight hundred feet in a minute, what should be its elevation that it may fall eleven hundred feet in the transit of five-eighths of a mile?" He had not only to work up the parabola, comparatively simple, but he had to allow for the resistance of the air, on the supposition of a calm, according to the really admirable formulas of Robins and Coulomb, which were the best he had access to. Joslyn brought me one day a letter from Bill Todhunter, which shows how carefully he went into this intricate inquiry.

Unfortunately for them all, it took possession of this spirited and accomplished young man. You see, he not only had the mathematical ability for the calculations of the fatal curve, but, as had been ordered without any effort of his, he was in precisely the situation of the whole world for trying in practice his own great experiment. At each of the two X of Joslyn's map, the company has, it happened, switches for repair trains or wood trains. Had it not, Bill Todhunter had ample power to make them.

For the "experiment," all that was necessary was that under the pretext of re-adjusting these switches, he should lay out that at the upper X so that it should run, on the exact grade which he required, to the western edge of the ravine, in a line which should be the direct continuation of the long, straight run, with which the little map begins.

An engine, then, running down that grade at the immense rapidity practicable there, would take the switch with its full speed, would fly the ravine at precisely the proper slopes, and, if the switch had been rightly aligned, would land on the similar switch at the lower X. It would come down exactly right on the track, as you sit precisely on a chair when you know exactly how high it is.

"If," And why should it not be rightly aligned, if Bill Todhunter himself aligned it? This he was well disposed to do. He also would align the lower switch, that at the lower X, that it might receive into its willing embrace the engine on its arrival.

When the bold engineer had conceived this plan, it was he who pushed the others on to it, not they who urged him. They were at work on their daily duty, sometimes did not meet each other for a day or two. Bill Todhunter did not see

them more than once in a fortnight. But, whenever they did meet, the thing seemed to be taken more and more for granted. At last Joslyn observed one day, as he ran down, that there was a large working party at the switch above Drums, and he could see Bill Todhunter, in his broad sombrero, directing them all. Joslyn was not surprised, somehow, when he came to the lower switch, to find another working party there. The next time they all three met, Bill Todhunter told them that all was ready if they were. He said that he had left a few birches to screen the line of the upper switch, for fear some nervous bungler, driving an engine down, might be frightened, and "blow" about the switch. But he said that any night when the others were ready to make the fly, he was; that there would be a full moon the next Wednesday, and, if there was no wind, he hoped they would do it then.

"You know," said poor Joslyn, describing it to me, "I should never have done it alone; August would never have done it alone; no, I do not think that Bill Todhunter himself would have done it alone. But our heads were full of it. We had thought of it, and thought of it, till we did not think of much else. And here was everything ready, and neither of us was afraid, and neither of us chose to have the others think he was afraid. I did say, what was the truth, that I had never meant to try it with a train. I had only thought that we should apply to the supe, and that he would get up a little excursion party of gentlemen—editors, you know, and stockholders—who would like to do it together, and that I should have the pleasure and honor of taking them over. But Todhunter poohed at that. He said all the calculations were made for the inertia of a full train, that that was what the switch was graded for, and that everything would have to be altered if any part of the plan was altered. Besides, he said the superintendent would never agree, that he would insist on consulting the board and the chief engineer, and that they would fiddle on it till Christmas."

"No," said Bill, "next Wednesday, or never! If you will not do it then, I will put the tracks back again." August Todhunter said nothing; but I knew he would do what we agreed to, and he did.

So at last I said I would jump it on Wednesday night if the night was fine. But I had just as lief own to you that I hoped it would not be fine. Todhunter—Bill Todhunter, I mean—was to leave the switch open after the freight had passed, and to drive up to the Widow Jones' Cross Road. There he would have a lantern, and I would stop and take him up. He had a right to stop us, as chief of repairs. Then we should have seven miles down grade to get up our speed, and then—we should see!

"Mr. Ingham, I might have spared myself the hoping for

gauge-car, and that he had not minded it. We never stopped at Drums unless we had passengers, or they. It was what we call a flag-station. So I blew Flanagan up, and told him he was gone too long.

"Well, sir, at Clayville we did stop, always stopped there for wood. August Todhunter, he was the palace conductor; he went back to look to his passengers. Bill staid with me. But in a minute August came running back, and called me off the engine. He led me forward where it was dark; but I could see, as we went, that something was to pay. The minute we were alone he says,—

"John, we've lost the rear palace."

"Don't fool me, August," says I.

"No fooling, John," says he. "The shackle parted. The cord parted, and is flying loose behind now. If you want to see, come and count the cars. The 'General Fremont' is here all right; but I tell you the 'James Buchanan' is at the bottom of Chamoguin Creek."

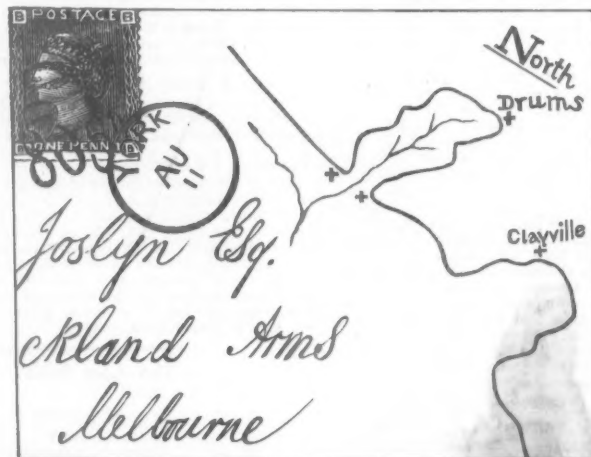
"I walked back to the other end of the platform as fast as I could go, and not be minded. Todhunter was there before me, tying up the loose end of the bell cord. There was a bit of the broken end of the shackle twisted in with the bolt. I pulled the bolt, and threw the iron into the swamp, far as I could fling her. Then I nodded to Todhunter, and walked forward, just as at old goose at Clayville had got his trousers on, so he could come out, and ask me if we were not ahead of time. I tell you, sir, I did not stop to talk with him. I just rang 'All aboard!' started her again; and this time I run slow enough to save the time before we came down to Steuben. We were on time, all right there."

Here poor Joslyn stopped a while in his story; and I could see that he was so wrought up with excitement, that I had better not interrupt, either with questions or with sympathy. He rallied in a minute or two, and said:

"I thought, we all thought, that there would be a dispatch somewhere waiting us. But no, all was as regular as the clock. One palace more or less—what did they know? and what did they care? So daylight came; we could not say a word, you know, with Flanagan there; and he only stopped, you know, a minute or two every hour; and just then was when August Todhunter had to be with his passengers, you know. Was not I glad when we came into Pemaquid!—our road ran from Pemaquid across the mountains to Eden, you know—when we came into Pemaquid, and nobody had asked any questions."

"I reported my time at the office of the master of trains, and I went home. I tell you, Mr. Ingham, I have never seen Pemaquid station since that day."

"I had done nothing wrong, of course. I had obeyed every order, and minded every signal. But still I knew public



foul weather. It was the finest moonlight night that you ever knew in October. And if Bill Todhunter had weighed that train himself he could not have been better pleased—one baggage-car, one smoking-car, two regular first-class, and two palaces; she run just as steady as an old cow! We came to the Widow Jones' square on time; and there was Bill's lantern waving. I slowed the train; he jumped on the tender without stopping it. I "up brakes" again, and then I told Flanagan, my fireman, to go back to the baggage-car, and see if they would lend me some tobacco. You see, we wanted to talk, and we didn't want him to see. "Mr. Todhunter and I will feed her till you come back," says I to Flanagan. In a minute after he he had gone, August Todhunter came forward on the engine; and, I tell you, she did fly!

"Not too fast," said Bill—"not too fast: too fast is as bad as too slow."

"Never you fear me," says I. "I guess I know this road and this engine. Take out your watch, and time the mile posts," says I; and he timed them. "Thirty-eight seconds," says he; "thirty-seven and a half, thirty-six, thirty-six, thirty-six—three times thirty-six, as we passed the posts, just as regular as an old clock! And then we came right on the mile post you know at Old Flander's; 'thirty-six,' says Bill again. And then she took the switch—I can hear that switch rod ring under us now, Mr. Ingham—and then—we were clear."

"Was not it grand! The range was a little bit up, you see, at first; but it seemed as if we were flying just straight across. All the rattle of the rail stopped, you know, though the pistons worked just as true as ever; neither of us said one word, you know; and she just flew—well, as you see a hawk fly sometimes, when he pounces, you know, only she flew so straight and true! I think you may have dreamed of such things. I have; and now—now I dream it very often. It was not half a minute, you know, but it seemed a good long time. I said nothing, and they said nothing; only Bill just squeezed my hand. And just as I knew we must be half over—for I could see, by the star I was watching ahead, that we were not going up but were falling again; do you think the rope by my side tightened quick, and the old bell on the engine gave one savage bang, turned right over as far as he catch would let it, and stuck where it turned! Just that one sound, everything else was still; and then she landed on the rails,—perhaps twenty feet inside the ravine,—took the rails as true and sweet as you ever saw a ship take the water, hardly touched them, you know, skimmed—well, as I have seen a swallow skim on the sea; the prettiest, well, the tenderest touch, Mr. Ingham, that ever I did see! And I could just hear the connecting rods tighten the least bit in the world behind me, and we went right on."

"We just looked at each other in the faces, and we could not speak; no, I do not believe we spoke for three-quarters of a minute. Then August said, 'Was not that grand? Will they let us do it always, Bill?' But we could not talk then. Flanagan came back with the tobacco, and I had just the wit to ask him why he had been gone so long. Poor fellow! he was frightened enough when we pulled up at Clayville, and he thought it was Drums. Drums, you see, was way up the bend, a dozen miles above Clayville. Poor Flanagan thought we must have passed there while he was sky-larking in the bag-

gation might be against me when they heard of the loss of the palace. I did not feel very well about it, and I wrote a note to say I was not well enough to take my train the next night; and I and Mrs. Joslyn went to New York, and I went aboard a Collins steamer as fireman, and Mrs. Joslyn she went as stewardess; and I wrote to Pemaquid and gave up my place. It was a good place, too; but I gave it up and I left America."

"Bill Todhunter, he resigned his place too, that same day, though that was a good place. He is in the Russian service now. He is running their line from Archangel to Astrachan; good pay, he says, but lonely. August would not stay in America after his brother left, and he is now captain's clerk on the Harkaway steamers between Bangkok and Cochabang; good place, he says, but hot. So we are all parted."

"And do you know, sir, never one of us ever heard of the lost palace!"

Sure enough, under that very curious system of responsibility by which one corporation owns the carriages which another corporation uses, nobody in the world has to this moment ever missed "The Lost Palace." On each connecting line everybody knew that "she" was not there; but no one knew or asked where she was. The descent into the rocky bottom of the Chamoguin, more than fifteen hundred feet below the line of flight, had, of course, been rapid,—slow at first, but in the end rapid. In the first second the lost palace had fallen sixteen feet; in the second, sixty-four; in the third, one hundred and forty-four; in the fourth, two hundred and fifty-six; in the fifth, four hundred feet; so that it must have been near the end of the sixth second of its fall, that, with a velocity now of more than six hundred feet in a second, the falling palace, with its unconscious passengers, fell upon the rocks at the bottom of the Chamoguin ravine. In the dead of night, wholly without jar or parting, those passengers must have been sleeping soundly. And it is impossible, therefore, on any calculation of human probability, that any one of them can have been waked an instant before the complete destruction of the palace by the sudden shock of its fall upon the bed of the stream. To them the accident, if it is fair to call it so, must have been wholly free from pain.

The tangles of that ravine, and the swamp below it, are such that I suppose that even the most adventurous, huntsman never finds his way there. On the only occasion when I ever met Mr. Jules Verne, he expressed a desire to descend there from one of his balloons, to learn whether the inhabitants of the lost palace might not still survive, and be living in a happy republican colony there,—a place without railroads, without telegrams, without mails, and certainly without palaces. But, at the moment when these sheets go to press, no account of such an adventure has appeared from his rapid pen. For myself, I do not believe in the colony. I believe that the passengers, to use the significant phrase of the owners, "never knew what hurt them." I see so many people in the world who would never be missed if they were not in it, that I have only to suppose that five-and-twenty of them had taken their chances that night in the lost palace car, and I then understand why no more inquiry seems to have been made for them than for the "James Buchanan."—*Old and New.*